NOV 23 1922

Employment Still Rising—Page 1406

L LIBRARY
23 1922
OF MICH

IRON TRADE REVIEW

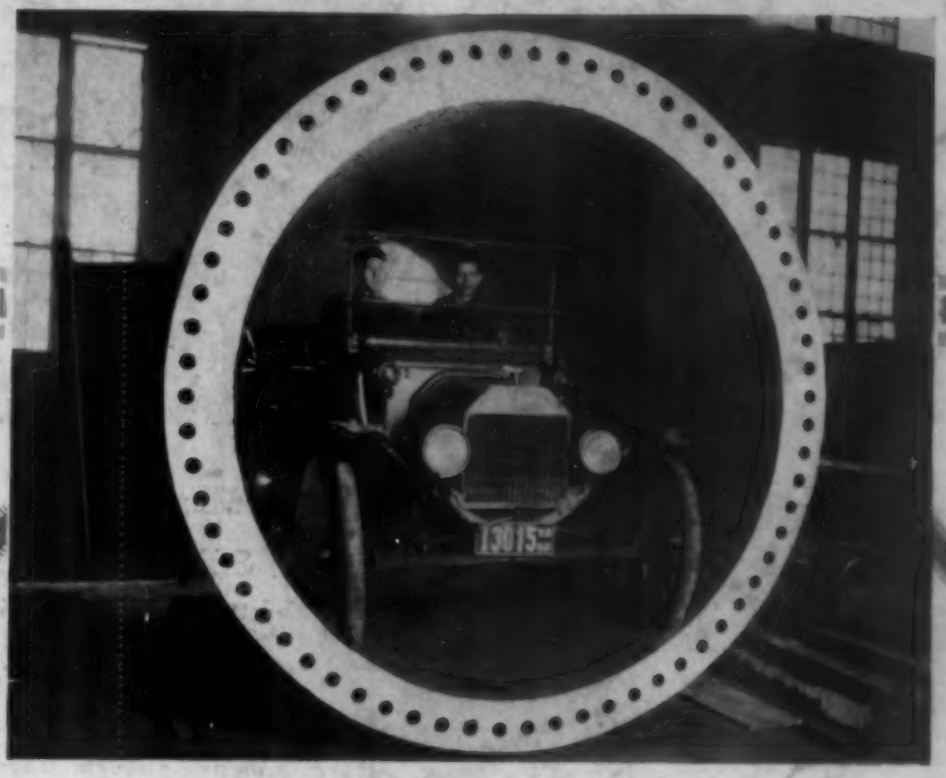
Registration Applied for

Published Weekly
VOL. LXXI. No. 21

CLEVELAND, O., NOVEMBER 23, 1922

Entered as second-class matter at the post-office in Cleveland, Ohio, under the act of March 3, 1879

Six Dollars a Year
Single Copy 25 Cents



Tee—96" x 96" x 54", Weight—45,100 lbs.

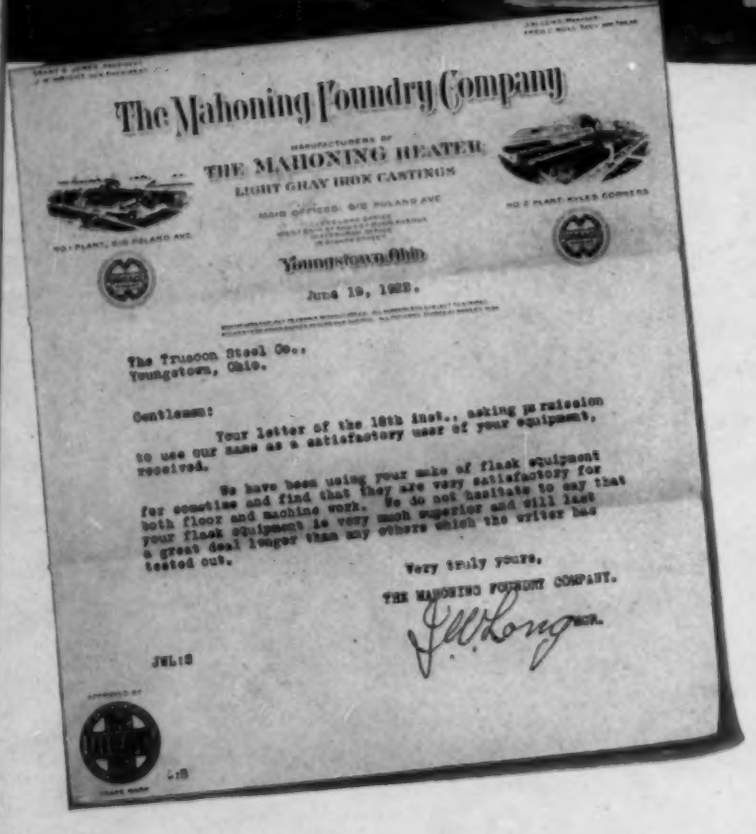
"WHEELING"
QUALITY CASTINGS

Steel Rolls: Supersteel Rolls:
Chilled Rolls: Sand Rolls:
Steel Castings: Iron Castings:
Rolling Mill and Special Machinery.

Also

The Mo-lyb-den-um Roll

WHEELING MOLD & FOUNDRY CO.
WHEELING, W. VA.



The Mahoning Foundry Company

MANUFACTURERS OF
THE MAHONING HEATER
LIGHT GRAY IRON CASTINGS

MAIN OFFICES: 618 POLAND AVE

Youngstown, Ohio

June 19, 1922.

The Truscon Steel Co.,
Youngstown, Ohio.

Gentlemen:

Your letter of the 18th inst., asking permission to use our name as a satisfactory user of your equipment, received.

We have been using your make of flask equipment for sometime and find that they are very satisfactory for both floor and machine work. We do not hesitate to say that your flask equipment is very much superior and will last a great deal longer than any others which the writer has tested out.

Very truly yours,

THE MAHONING FOUNDRY COMPANY.

J. W. Long MGR.

JWL:B

Setting the Pace is an Old Story

This letter from the Mahoning Foundry Company is just another proof of the superiority of Truscon Alloy Steel Flasks. The picture shows a few 14" x 20" flasks. Each cope and drag is readily handled by one man. Notice the close fit of the pattern in the flasks shell. That means a big saving in sand and labor. Compare Truscon flasks with the bulky old wood flasks in the background of the picture and see how much floor space is saved. Rigid Truscon construction stands the daily knocks. The heavy pins and brackets do not get out of alignment.

Is it any wonder that Truscon rust resisting alloy steel flasks are the standard of equipment in more than a hundred of the countries largest foundries?

Truscon Steel Co.

Youngstown **Ohio**

Representatives in Principal Cities

TRUSCON ALLOY FLASKS STEEL

FOUNDRY PRODUCTS
TRUSCON STEEL CO

IRON TRADE REVIEW
Registration Applied For
The Authority of Industry — National and International
Vol. LXXI — Cleveland, O., November 23, 1922 — No. 21

Output Now Best in Two Years

Additions to Active Iron and Steel Capacity Still Being Made—First Quarter Buying Appearing but Old Orders Supply Foundation for Present Production—Chicago Maker Applies Present Prices to Next Year

FURTHER additions are being made to active iron and steel capacity and the rise of production still is the commanding feature of the situation. Operations are working close to 80 per cent, the best record in two years. At Pittsburgh the Jones & Laughlin Steel Co. for the first time in two years has all its 12 blast furnaces in commission. The last furnace of the Carnegie Steel Co. group at Youngstown is going in. Independent sheet mill output has been lifted to the highest point ever reported statistically, scoring almost 92 per cent in October. New buying is well below output but the heavy volume of unfilled orders is keeping up the pressure on capacity.

Iron ore on hand at furnaces and lower lake docks as of Nov. 1 was about 5,000,000 tons more than on the corresponding date in 1921. The amount was 44,181,000 tons. In 1920 it was 39,600,000 tons and in 1919 40,000,000 tons. This indicates ample supplies will be on hand until the resumption of shipping next spring.

More car inquiries are coming out. Chicago mills which are getting the fullest benefit of the heavy negotiations by western roads have under protection about 400,000 tons of steel for 38,500 cars now pending in their territory.

Buying for Future

Steel buying definitely for 1923 requirements is gathering some volume. A Chicago independent producer has opened its books for first quarter for plates, shapes, bars and sheets at unchanged prices and is taking tonnage. Automobile builders have closed in the Mahoning valley and elsewhere for some round tonnages of full finished sheets for first quarter and also more freely are distributing parts contracts against next year's production schedules. Some of the automobile plants are asking the mills to double the tonnage of sheets called for by fourth quarter requirements. The leading steelmaker still has announced no decision as to first quarter prices. Since its mills already are obligated on carryover tonnage into March, such announcement will be of restricted significance.

Weakness in black sheets has continued with some producers accepting tonnage as low as 3.25c Pittsburgh or $2 under the schedule of the leading interest. Sheet bars have been sold at $37.50, Youngstown, a sale of 2000 tons being reported at that figure. Otherwise steel prices appear better stabilized.

New Tonnage Appears

The seasonal letdown in new structural undertakings is very gradual. October bookings by the fabricating shops were 121,763 tons or 54.9 per cent of capacity as against 136,587 tons and 61.6 per cent in September and 143,515 tons and 64.7 per cent in August. Structural lettings this week total 11,000 tons. Chicago reports 30,000 tons of new work now active with almost 70,000 tons to come out before February. Important projects include 10,000 tons for a bridge at St. Charles, Mo., and 8000 tons for a new station for the Commonwealth Edison Co., Chicago. The Standard Oil Co. of Indiana is inquiring for 12,000 tons of tank work for Wyoming. Other oil field demands are numerous. American foundries are bidding on 20,000 tons of large size pipe for San Juan, Porto Rico.

IRON TRADE REVIEW weekly composite of fourteen iron and steel products still is falling. The week's average is $41.78 compared with $42.41 last week and $42.72 two weeks ago.

Iron Inquiry Larger

While the expected buying movement in pig iron has not yet appeared, large negotiations are more numerous. A central Michigan automobile foundry is inquiring for 18,000 tons of foundry and malleable for this year's delivery but it is questioned whether a purchase will result. A Phillipsburg, N. J., pipe works and a similar plant are figuring on 15,000 tons each against pending business. The American Radiator Co. credited as a receptive buyer of 50,000 tons has taken no action. Round tonnages of southern iron for this year and first quarter have been closed at $23 to $23.50 Birmingham and it is probable some heavy lots by cast iron pipe makers are included as these consumers are reported to have been in the market. In addition to the South, softer iron prices again are shown this week at various centers.

Business Trend and Chart Section_Page 1403

IRON TRADE REVIEW

Registration Applied For

The Authority of Industry National and International

Published Every Thursday by

THE PENTON PUBLISHING CO., CLEVELAND, O.

Member, Audit Bureau of Circulations, Associated Business Papers, Inc., and National Publishers Association

BRANCH OFFICES

BOSTON - - - - - - - - - 426 Old South Bldg.
CHICAGO - - - - - - - - 1147 People's Gas Bldg.
CINCINNATI - - - - - - - - 504 Edwards Bldg.
NEW YORK - - - - - 2203-2206 No. 220 Broadway
PITTSBURGH - - - - - - - 2148-49 Oliver Bldg.
SAN FRANCISCO - - - - - - 675 Monadnock Bldg.
WASHINGTON - - - - - - - 84 Home Life Bldg.

FOREIGN OFFICES

BIRMINGHAM, ENG. - - - - - - - Prince's Chambers
LONDON, ENG. - 2-3 Caxton House, Westminster, S. W. 1.
PARIS, FRANCE - - - - - - - - 224 Rue de Rivoli

Cable Address, IROTRAPEN, London

Subscription, United States, Cuba and Mexico, $6 per year. Canada and other Foreign Countries, $8.50 per year.
Entered at the Postoffice at Cleveland as Second Class Matter

Copyright 1922 by The Penton Publishing Co.

IN THIS ISSUE

Nov. 23, 1922

	Page
Iron and Steel Market Review	1379
Editorials	1380, 1381
Iron, Steel and Scrap Prices	1382, 1442, 1446, 1452
Index to Market Reports	1383
Iron and Steel Markets	1383 to 1393
Foreign Markets	1398 to 1401
Business Trend Section	1403 to 1406
Government Rests in Basing Case	1396
Americans Ask for British Scrap	1398
Autumn Trade Peak Is Passing	1402
Training Steelworks Foremen—I	1407
Welds Galvanized Steel Storage Tanks	1409
Reviews Blast Furnace Practice	1410
Creating a Broader Market for Coke	1414
Grinder Finishes Machine Ways	1415
Urge Small Tool Standardization	1417
Determining the Best Way To Do Work	1419
Builds Sheet Mill at Lake Port	1423
Amendments to Rail Act Opposed	1429
Labor Unions Should Be Studied	1430
Ore Shippers Seek Rate Refund	1434
Northwest Business Is Improving	1436
Shop Equipment Demand Small	1439

Ore Shippers Should Have Hearing

AN IMPORTANT issue of considerable interest to all shippers is raised by the Lake Superior iron ore operators who have protested against the examiner's report in the case before the interstate commerce commission for a reduction of rates on ore on the upper lake railroads. The point involved is whether the ore shippers can obtain a decision based on the evidence which they have submitted, or if the policy to be pursued by the commission as recommended by its examiner is to compute new rates solely on old ones, regardless of whether the old rates were justified.

In the ore rate case the examiner has disregarded, without condemning, the shippers' evidence of cost of the transportation service, and according to the shippers has rested his conclusions wholly upon the basis of a comparison of the increase of ore rates with the increase of all rates since June, 1918. The shippers point out in the bill of exceptions they have filed with the commission that the examiner's report in effect denies to them strict determination of reasonable rates to which they are entitled under the law.

As the shippers explain: "The case involves a unique and segregated transportation service peculiarly capable of separate and specific investigation—a service of which the cost can be approximated with unusual accuracy ..... In the present case the ownership by the Steel corporation of the two principal ore roads requires that cost be made the basis and foundation of the decision."

In no other case ever presented to the commission, it is claimed, were more elaborate and more accurate exhibits made as to cost of a particular transportation service than in this. The figures were not refuted by the railroads. They were not based on a "fat year, 1920," as claimed by the examiner, the ore shippers contend, but on an extensive and broad study of the entire iron ore transportation system by some of the best experts available.

After the shippers filed their original complaint the old range railroads increased their rates on February, 1921. The examiner held these increases to be unreasonable, but notwithstanding this made no recommendation for a refund of the increase. There is justification for the shippers' claim that the extra charge thus collected by the railroads should be returned. The shippers clearly are entitled to a consideration of their evidence, and it is to be hoped that the commission will concede this point at the outset.

Helping the Foreman Train Himself

SO MUCH has been written of the problems of the foreman that it sometimes is difficult to maintain a proper perspective in judging his strong and weak points. The growth of industry in the past 20 years has played havoc with the peace of mind of the average foreman. Employment departments, personnel activities, physical inspection, cost accounting systems and numerous other adjuncts of modern manufacturing have had a hand in disrupting his old-time position of authority.

Where once his was the right to hire and fire, now he can only recommend to the employment manager. At one time answerable only to the superintendent, he now has to dovetail his actions with those of a half-dozen department heads. The pride that he once took in leading his men and in interpreting for them the policies of their employers is largely submerged in the network of interference which is a necessary part of modern organization.

For this reason it is desirable that each foreman have a broader knowledge of the purpose and policies of industrial management, and this has led to a veritable flood of foremen's training courses. Results from the numerous systems of training that have been tried during the past few years are far from uniform. In many cases classes have been organized and training started with great enthusiasm, only to die out a few weeks later from lack of sustained interest. In a number of instances the co-operation of plant execu-

tives has spelled success for the courses, while in others undue interest from higher up has been wrongly construed by the foremen, with resultant disaster for the plan of training.

However, the reasons for success or failure daily are becoming more apparent. It is fairly certain that appropriate and carefully prepared text matter is one of the first essentials. Even more important is the degree and manner of executive participation in the foremen's classes. Experience shows that the presence of a few higher officials has a beneficial influence. On the other hand, undue pressure from above is disastrous. In fact, the method of establishing classes requires a great deal of study and often is a deciding factor in the success or failure of the project.

On page 1407 of this issue, an authority on industrial training outlines the steps most necessary to attract the interest of foremen. The problem is so important and the attitude of foremen so sensitive that manufacturers will do well to study the experience of those who have been successful. The foreman is a "pivot" man, but under the present plan of organization he must acquire a broader viewpoint than heretofore if he is to be successful. Employers should assist him in getting a true perspective of his job.

Keen Interest

of IRON TRADE REVIEW in Rendering Maximum Service to Readers Is Commended

THE keen interest that you are taking in order to make IRON TRADE REVIEW of maximum service to its readers is commendable. The Business Trend section was a very helpful addition, containing in brief form valuable information which I dare say the average business man had not given much consideration.

Of course, the articles of most interest to us are those covering the railroad situation in general from a transportation standpoint, new car and locomotive orders, steel prices, etc.—*J. W. Kearney, superintendent, The Canton Car Co., Canton, O.*

We find IRON TRADE REVIEW to be of considerable service to us as it enables us to keep in touch with the iron and steel market.—*W. B. Lombard, assistant treasurer, Daisy Mfg. Co., Plymouth, Mich.*

We have found IRON TRADE REVIEW extremely valuable and we would particularly endorse your weekly charts.—*L. P. Barrett, mining geologist, department of conservation, Geological Survey Division, Lansing, Mich.*

Tariff Affects Metal Market

SUFFICIENT time has elapsed since the enactment of the new tariff law to enable a survey of some of the immediate effects of the new rates. In certain items in the metal group the discounting of the new tariff began a week or two before the bill was signed. In others, such discounting began after the bill was signed.

Ferrotungsten has advanced from 41 to 94 cents a pound contained in about two months; tungsten concentrates from $3 a unit to $7.50 a unit. Purchases for importation have ceased, at least temporarily. Fifty per cent ferrosilicon has advanced in price from $55 to $75, delivered. Importation of this material has ceased.

Before the tariff was enacted, 4 to 6 per cent carbon ferrochrome was quoted 12 cents a pound contained by domestic makers and 10 cents by importers. The importers have advanced their price to 12 cents duty paid, but domestic alloy still can be bought at 12 cents. Manganese ore purchases were heavy prior to the signing of the bill; subsequently they have been lacking. The market now is nominally quoted at the old price plus the duty, in other words, 29 cents and 22.4 cents totaling 51.4 cents.

The duty on pig lead was advanced from 25 per cent ad valorem to 2½ cents specific. The demand in this country has been so heavy and domestic production has gained so slowly that the American market has discounted the entire increase in duty in the face of a higher world market and now is drawing supplies of Mexican lead on a large scale.

The duty on zinc was increased from 15 per cent ad valorem to 1¼ cents a pound, specific. While this has given increased production to the zinc industry, the shortage in Europe has become so acute that there have been heavy purchases of American zinc for export to Great Britain and the Continent. Prices both here and in London have risen to the highest levels in two years.

While no duty was imposed on copper, fabricated products have been given a protection, ranging from 2½ cents on sheets and rods to 7 cents on tubes and 12 cents on brass angles and channels. Foreign competition has not been an important factor in the market and the imposition of the duties has had no immediate market effect. The antimony market discounted the full increase in the duty from 10 per cent ad valorem to 2 cents a pound specific prior to the signing of the bill and since then has eased off.

The domestic aluminum producer has made two price advances totaling 3 cents a pound since the law became effective increasing ingot aluminum duties from 2 to 5 cents a pound. In other words the full increase in duty has been met by the market. Foreign aluminum in good sized tonnages has been sold for importation, for 1923 delivery.

In general the tariff has been an important factor in the metal markets though much of its first effects has been discounted, as was to be expected.

Composite Market Average

Representing the Combined Average Prices per Ton of Fourteen Leading Iron and Steel Products, Yesterday, One Week, One Month, Three Months, One Year and Nine Years Ago

November 22, 1922	November 15, 1922	October, 1922	August, 1922	November, 1921	November, 1913
$41.78	$42.41	$43.60	$39.79	$34.71	$24.02

Products Included Are Pig Iron, Billets, Slabs, Sheet Bars, Wire Rods, Steel Bars, Plates, Structural Shapes, Black, Galvanized and Blue Annealed Sheets, Tin Plate, Wire Nails and Black Pipe

SCRAP PRICES, PAGE 1450, WAREHOUSE, PAGE 1442, ORE, NUTS, BOLTS AND RIVETS AND PIPE PRICES, PAGE 1446

Iron and Steel Prices

Pig Iron

Bessemer, valley	$31.50
Bessemer, Pittsburgh	33.27
Basic, valley	27.00 to 28.00
Basic, Pittsburgh	28.77 to 29.77
Basic, Buffalo	27.75
Basic del., eastern Pa.	27.50 to 28.00
Malleable, valley	29.00
Malleable, Pittsburgh	30.77
Malleable, Chicago	30.00
Malleable, Buffalo, furnace	27.75 to 28.25
Malleable, del., eastern Pa.	31.00 to 31.50

FOUNDRY IRON SILICONS

No. 2 Northern	1.75 to 2.25
No. 2 Southern foundry	1.75 to 2.25
No. 2X East'n and Virginia	2.25 to 2.75
No. 1X Eastern	2.75 to 3.25
No. 1 Chicago	2.25 to 2.75
No. 2 foundry Eastern	1.75 to 2.25

No. 1X, eastern del. Phila.	32.13 to 33.64
No. 1X, Buffalo	28.00 to 29.25
No. 2 foundry, valley	27.50 to 28.00
No. 2 foundry, Pittsburgh	29.27 to 29.77
No. 2 foundry, Buffalo	26.50 to 27.75
No. 2 foundry, Chicago	30.00
No. 2 foundry, Granite City	31.00 to 32.00
No. 2 foundry, Ironton furnace	29.00 to 30.00
No. 2 foundry, Cleveland del.	30.50 to 31.00
No. 2 foundry, del., Phila.	30.13 to 31.64
No. 2 foundry, N. J. tidewater	30.13 to 33.02
No. 2X, eastern del., Phila.	31.13 to 32.64
No. 2X, east. N. J. tidewater	31.13 to 34.02
No. 2X, eastern del. Boston	33.15 to 33.65
No. 2X foundry, Buffalo fur.	27.00 to 28.25
No. 2X, Buffalo del. Boston	32.91 to 33.91
No. 2 southern, Birmingham	23.00 to 24.00
No. 2 southern, Cincinnati	27.05 to 28.05
No. 2 southern, Chicago	29.01 to 30.01
No. 2 southern, Philadelphia	30.80 to 31.80
No. 2 southern, Cleveland	29.01 to 30.01
No. 2 southern, Boston (rail)	32.61 to 33.61
No. 2 southern, St. Louis	28.17 to 30.17
No. 2X, Virginia furnace	30.50 to 33.00
No. 2X, Virginia Phila.	35.67 to 38.17
No. 2X, Virginia Jersey City	36.04 to 38.04
No. 2X, Virginia Boston	36.42 to 38.92
Gray forge, eastern Pa.	29.00 to 30.00
Gray forge, val. del. Pitts.	28.27 to 28.77
Low phos., standard, valley	36.00 to 37.00
Low phos., standard, Phila.	41.00
Low phos., Lebanon furnace	35.00
†Low phos. British tidewater	28.75 to 29.75
Charcoal, Birmingham	32.00 to 34.00
Charcoal, Superior, Chicago	36.15

Silvery Iron
Jackson County, Ohio, furnace

8 per cent	$37.50 to 39.50
9 per cent	39.50 to 41.50
10 per cent	41.50 to 43.50
11 per cent	44.80 to 46.80
12 per cent	48.10 to 50.10

Bessemer Ferrosilicon
Jackson County, Ohio, furnace

10 per cent	$48.50
11 per cent	51.80

Ferroalloys

Ferromanganese, 78 to 82 per cent domestic, f.o.b. furnace	$100.00
Ferromonganese, delivered, Pittsburgh	104.91 to 105.47
†Ferromanganese, 79 per cent, English, c.i.f. Atlantic port	100.00 to 100.68
Spiegel, 19 to 21 per cent furnace spot nominal	36.00 to 37.00
†Spiegel, 20 per cent English, c.i.f. Atlantic port	36.50
Ferrosilicon, 50 per cent contract freight allowed	75.00 to 80.00
Ferrotungsten, standard, per pound contained	92.00 to 94.00
Ferrochrome, 60 to 70 chromium, 4 to 6 carbon, per pound contained, makers plant	12.00c to 13.00c
Imported ferrochrome, 4 to 6 per cent carbon	12.00c
Ferrovanadium, 30 to 40 per cent per pound estimated, according to analysis	$3.50 to $4.00
Ferro carbon-titanium, carloads, producers plant, per net ton	$200.00

†Duty paid.

Coke

Beehive, Ovens

Connellsville furnace	$6.75 to 7.25
Connellsville foundry	8.00 to 8.50
Pocahontas furnace	9.00 to 10.00
Pocahontas foundry	10.00 to 11.00
New River furnace	9.00 to 10.00
New River foundry	13.00 to 15.00
Wise county furnace	7.00 to 8.00
Wise county foundry	9.00 to 10.00
Alabama furnace	7.00 to 8.00
Alabama foundry	7.50 to 8.50

By-Product

Foundry, Newark, N. J., del.	$12.84 to 12.91
Foundry, Chicago, ovens	15.00
Foundry, Boston, delivered	16.00
Foundry, Granite City, Ill., ovens	14.00
Foundry, Alabama	8.50 to 9.00

Semifinished Material

BILLETS AND BLOOMS
(4 x 4-inch)

Open-hearth, Pittsburgh	$38.00
Open-hearth, Youngstown	38.00
Open-hearth, Philadelphia	43.17 to 45.17
Bessemer, Pittsburgh	38.00
Bessemer, Youngstown	38.00
Forging, Pittsburgh	42.50 to 47.50
Forging, Philadelphia	50.17

SHEET BARS

Open-hearth, Pittsburgh	$38.00
Open-hearth, Youngstown	38.00
Bessemer, Pittsburgh	38.00
Bessemer, Youngstown	38.00

SLABS

Pittsburgh and Youngstown	38.00

WIRE RODS AND SKELP

Wire rods, Pittsburgh	$47.50 to 50.00
Grooved skelp, Pittsburgh	2.00c to 2.10c
Universal skelp, Pittsburgh	2.00c to 2.10c
Sheared skelp, Pittsburgh	2.00c to 2.10c

Shapes, Plates and Bars

Structural shapes, Pittsburgh	2.00c to 2.15c
Structural shapes, Phila.	2.275c to 2.425c
Structural shapes, New York	2.29c to 2.44c
Structural shapes, Chicago	2.10c to 2.20c
Tank plates, Pittsburgh	2.00c to 2.10c
Tank plates, Philadelphia	2.275c to 2.425c
Tank plates, New York	2.29c to 2.44c
Tank plates, Chicago	2.10c to 2.30c
Bars, soft steel, Pittsburgh	2.00c to 2.10c
Bars, soft steel, Philadelphia	2.225c to 2.425c
Bars, soft steel, New York	2.24c to 2.44c
Bars, soft steel, Chicago	2.00c to 2.10c
Bars, forging, Pittsburgh	2.60c to 2.75c
Bars, rail steel, Chicago	2.00c
Reinforcing bars, Pittsburgh	1.95c to 2.10c
Bar iron, common, Phila.	2.325c to 2.375c
Bar iron, common, New York	2.34c to 2.39c
Bar iron, common, Chicago	2.50c

Hoops, Bands, Shafting

Hoops, Pittsburgh	2.90c to 3.00c
Bands, Pittsburgh	2.90c to 3.00c
Cotton ties, per bundle Pitts.	$1.14
Cold finished steel bars, Pittsburgh base	2.50c to 2.75c
Steel shafting	2.50c to 2.75c

Rails, Track Material

Standard bessemer rails, mill	$43.00
Standard open hearth rails, mill	43.00
Relaying rails, St. Louis	27.00 to 31.50
Relaying rails, Pittsburgh	28.00 to 32.00
Light rails, 25 to 45, mill	2.00c to 2.15c
Angle bars, Chicago base	2.75c
Spikes, railroad, Pittsburgh	2.75c to 2.85c
Spikes, small and boat, Pitts.	3.50c to 3.75c
Spikes, railroad, Chicago	2.85c to 3.00c
Track bolts, Pittsburgh	3.85c to 4.50c
Track bolts, Chicago	3.85c to 4.00c
Tie plates, Pittsburgh	2.35c to 2.50c
Tie plates, Chicago	2.35c

Wire Products

100 lbs. to Jobbers in Carloads

Wire nails, Pittsburgh	2.70c
Plain and annealed wire, Pitts.	2.45c
Galvanized wire, Pittsburgh	2.95c
Barbed wire, painted, Pitts.	2.85c
Barbed wire, galv., Pittsburgh	3.35c
Polished staples, Pittsburgh	2.85c
Galvanized staples, Pittsburgh	3.35c
Coated nails, count keg, Pitts.	2.20c
Woven wire fencing (retailers)	68 off
Woven wire fencing (jobbers)	70½ off

Chain, Piling, Strip Steel

Chain, 1-in. proof coil, Pitts.	6.00c
Sheet piling base, Pittsburgh	2.05c to 2.15c
Hot rolled strip steel, Pittsburgh stamping quality	2.90c to 3.00c
Cold rolled strip steel, hard coils, 1¼ inches and wider by 0.100-inch and heavier, base	4.50c

Sheets

SHEET MILL BLACK

No. 28, open-hearth, Pittsburgh	3.25c to 3.35c
No. 28, bessemer, Pittsburgh	3.25c to 3.35c
No. 28, open-hearth, Phila.	3.675c to 3.825c
No. 28, open-hearth, Chicago	3.59c to 3.69c

TIN MILL BLACK

No. 28, open-hearth, Pittsburgh	3.35c to 3.50c
No. 28, open-hearth, Chicago	3.69c

GALVANIZED

No. 28, open-hearth, Pittsburgh	4.35c to 4.50c
No. 28, bessemer, Pittsburgh	4.35c to 4.50c
No. 28, open-hearth, Phila.	4.675c
No. 28, open-hearth, Chicago	4.64c to 4.69c

BLUE ANNEALED

No. 10, open-hearth, Pittsburgh	2.50c to 2.65c
No. 10, bessemer, Pittsburgh	2.50c to 2.65c
No. 10, open-hearth, Phila.	2.825c to 3.075c
No. 10, open-hearth, Chicago	2.84c to 2.89c

AUTOMOBILE SHEETS

No. 22 Pittsburgh	4.70c to 5.00c

Tin Plate

Per 100 lb. box.

Tin plate, coke base, Pitts.	$4.75

Iron and Steel Pipe

Base Discounts Pittsburgh to Jobbers in Carloads

	Black	Galv.
1 to 3-inch, butt steel	66	54½
1 to 1½-inch, butt iron	34	19

Boiler Tubes

Carload Discount 4 Points Larger

Steel, 3¼ to 13 inches, l. c.	48 off
Charcoal iron, 3¼ to 4½ inches l. c. l.	16 off
Seamless, hot rolled, 3¼ to 4-in., l. c.	1.45 off

Cast Iron Water Pipe

Class B Pipe

Four-inch, Chicago	$55.20 to 56.20
Six-inch and over, Chicago	51.20 to 52.20
Four-inch, New York	60.30
Six-inch and over, New York	55.30
Four-inch, Birmingham	47.50 to 48.00
Six-inch and over, Birmingham	43.00 to 43.50
Three-inch, Birmingham	56.50 to 57.00

Class A pipe is $4 higher than Class B. Standard fittings, Birmingham, base, $110.00 6 to 24-inch, base; over 24-inch, plus $20; 4-inch, plus $20; 3-inch, plus $20; gas pipe fittings, $5 higher.

Prices Present and Past

Representative market figures yesterday, and for last month, three months ago and one year ago

	Nov. 22, 1922	Oct. 1922	Aug. 1922	Nov. 1921
PIG IRON				
Bessemer, valley, del., Pitts....	$33.27	$35.12	$29.16	$21.96
Basic valley, del., Pittsburgh....	28.77	32.37	27.96	20.96
*No. 2 foundry, del., Pittsburgh.	29.27	33.62	32.76	22.81
*No. 2 foundry, Chicago	30.00	31.75	28.60	21.00
Lake Superior charcoal, Chicago.	36.15	36.15	33.75	32.25
Malleable, valley	30.00	34.62	28.60	20.00
Malleable, Chicago	30.00	31.75	28.60	21.00
*Southern No. 2, Birmingham.	23.00	27.40	20.70	18.25
*Southern Ohio, No. 2 Ironton..	29.00	32.40	27.00	20.50
Basic eastern del., eastern Pa..	27.65	30.25	29.50	20.90
**No. 2X, Virginia furnace	30.50	33.00	26.00	22.80
**No. 2X, eastern del. Phila.....	31.13	33.00	32.15	22.50
Gray forge val. del., Pittsburgh.	28.27	33.27	30.16	21.96
Ferromanganese, del., Pittsburgh	104.91	105.47	72.29	60.00
SEMIFINISHED MATERIAL—				
Sheet bars, bessemer, Pittsburgh.	38.00	39.85	35.00	30.00
Sheet bars, open-hearth, Pittsburgh	38.00	39.85	35.00	30.00
Billets, bessemer, Pittsburgh.....	38.00	40.00	35.00	29.00
Billets, open-hearth, Pittsburgh...	38.00	40.00	35.00	29.00
FINISHED MATERIAL—				
Steel bars, Pittsburgh	2.00	2.00	1.80	1.55
Steel bars, Chicago	2.00	2.00	1.88	1.68
Steel bars, Philadelphia	2.325	2.325	2.275	1.90

*1.75 to 2.25 silicon

	Nov. 22, 1922	Oct. 1922	Aug. 1922	Nov. 1921
FINISHED MATERIAL Continued				
Iron bars, Philadelphia	$2.325	$2.325	$2.125	$1.90
Iron bars, Chicago mills.....	2.50	2.50	1.98	1.70
Beams, Pittsburgh	2.00	2.00	1.80	1.60
Beams, Philadelphia	2.325	2.325	2.325	1.90
Beams, Chicago	2.10	2.10	1.90	1.68
Tank plates, Pittsburgh.....	2.00	2.05	1.80	1.55
Tank plates, Philadelphia	2.325	2.425	2.325	1.90
Tank plates, Chicago.....	2.10	2.10	1.90	1.68
Sheets, blk., No. 28, Pittsburgh.	3.25	3.50	3.25	2.95
Sheets, blue anl., No. 10, Pitts..	2.60	2.60	2.45	2.40
Sheets, galv., No. 28, Pittsburgh	4.35	4.50	4.25	3.95
Wire nails, Pittsburgh	2.70	2.70	2.40	2.90
COKE—				
Connellsville furnace, ovens	6.75	10.60	13.20	3.15
Connellsville foundry, ovens.....	8.00	12.10	14.30	4.30
OLD MATERIAL—				
Heavy melting steel, Pittsburgh.	20.00	21.35	17.10	14.25
Heavy melting steel, east. Pa..	16.50	18.00	15.25	12.60
Heavy melting steel, Chicago....	17.00	18.50	15.80	12.40
No. 1 wrought, eastern Pa.....	21.00	22.50	18.25	16.50
No. 1 wrought, Chicago.....	17.50	20.40	16.35	13.70
Rails for rolling, Chicago.....	18.00	20.50	16.75	13.90

**2.25 to 2.75 silicon

Large Pig Iron Inquiries Appear

Michigan Automobile Foundry Seeks 18,000 Tons, Cast Iron Pipe Shops, 15,000 Tons Each—Round Tonnages Reported Placed in South at $23 to $23.50—New Buying Still Backward, However—Price Weakness Remains

Chicago, Nov. 21.—Pig iron buying is light and is confined to purchases for prompt shipment. Users apparently look for further price recessions, but continue to press for deliveries against contracts, thereby indicating both the maintenance of melt in this territory and the low stocks of iron with the foundries. Little first quarter business has been placed but melters are showing more interest in their requirements and are sounding sellers for prices. The forward market on local iron is indefinite because of a lack of sales. Prompt iron demands a maximum of $30 base furnace and it is possible tonnage for future delivery might develop concessions. The market is weak but the furnaces have not been able to accumulate winter reserves of fuel and severe weather will cripple production severely. An eastern Michigan automobile plant is inquiring for 18,000 tons of various grades for prompt shipment. A local buyer wants 500 to 1000 tons of low phosphorus for an eastern plant. Southern iron sales are few and $23 Birmingham for No. 2 appears the bottom of the market. Silveries are now generally quoted at $37.50 Jackson county Ohio furnace for 8 per cent; $36 for 7 per cent and $35 for 6 per cent. This is $2 under the previous quotation.

Inquiry Is Heavier

Philadelphia, Nov. 21.—Inquiry for pig iron is heavier by reason of the presence of several large tonnages. General buying still is lacking. Basic predominates. One Eastern mill is buying 6000 tons of this grade and another inquiring for several thousand tons. Two pipe companies each are inquiring for 15,000 tons of foundry iron against inquiries for pipe on which they are quoting. Eastern market on foundry iron generally is holding strong. It is reported, though doubted, that some No. 2 plain (1.75 to 2.25 silicon) has been sold at $28.50 furnace. Apparently $29 still is the minimum for No. 2 plain plus $1 differential for silicon. Some eastern Pennsylvania malleable has been sold at $30 furnace. An eastern merchant producer announced today it is offering until Dec. 1 a limited tonnage of foundry iron for first quarter at the present price; on Dec. 1 it will advance to $30 base. Some quiet first quarter buying has been done the past week and this runs into considerable tonnage. High phosphorus French iron has been offered down to $21.50 c.i.f. tidewater, but due to the rise in the franc the minimum now appears to be $22. English and continental iron equivalent to standard foundry grades brings from $26 to $27.50 duty paid tidewater. Virginia furnaces sold some tonnage the past week at $30 to $32 furnace for No. 2 plain: $30.50 to $33 for No. 2X; and $31 to $34 for No. 1X. Considerable pipe iron also has been sold by Virginia makers at $28 to $28.50 furnace. The Robesonia, Pa., furnace resumed operations yesterday on low phosphorus iron but will switch to foundry iron within a short time.

Market Report Index

	Prices page	Market page
Weekly Market Review	....	1379
Cars and Track Materials	1382	1382
Wire	1382	1382
Pig Iron	1382	1383
Coke	1382	1385
Bars	1382	1386
Nuts, Bolts and Rivets	1442	1386
Hoops and Bands	1382	1386
Ore	1442	1386
Plates	1382	1387
Scrap	1446	1388
Warehouse	1428	1388
Semifinished Steel	1382	1388
Tin Plate	1382	1389
Sheets	1382	1389
Cold-Rolled Strip Steel	1382	1389
Wire	1382	1390
Structural Shapes	1382	1390
Concrete Reinforcing Bars	1382	1392
Merchant and Cast Pipe	1382 and 1442	1392
Ferroalloys	1382	1392
Nonferrous Market	1393	1393
British Market (Cable)	1399	1398
Birmingham Market	1399	1398
Japanese Market	....	1399
French Market	1399	1400
German Market	1399	1400
Canadian Market	....	1400
Coke By-Products	1428	1432
Machine Tools	....	1439

Price Drops Not Arrested

Pittsburgh, Nov. 21.—Falling pig iron prices have not as yet been arrested and levels this week are from 50 cents to $1 per ton lower. Purchases largely are withheld and only small lots are being placed. Shipments yesterday, to-

day and tomorrow will doubtless be on a much heavier scale than they were the latter part of last week due to the removal yesterday of the Pennsylvania railroad's embargo until Thursday morning. In connection with basic, several negotiations still are under way but the Edgewater Steel Co. is reported to have closed on 1000 tons. The Allegheny Steel Co. withholds its order; the West Penn Steel Co., the Follansbee Brothers Co. and other basic users all are interested in securing prices but likewise ho'd up contracts apparently in the hope of developing lower figures. As low as $27, valley, now is quoted on basic and the market spread is $27 to $28. Producers intimate if enough bessemer business at $30 were offered they would go into blast. Those now making it, however, are quoting $31.50, valley. It is understood the Monongahela Iron & Steel Co. will buy a further tonnage of bessemer. The malleable market is untested at $29, valley, and tonnage probably would develop a $28 figure. Copper-free low phosphorus iron continues to sell here in small lots at $37, valley. Producers, however, have sold this grade in other directions as low as $36, valley. A refined ironmaker here recently bought some British low phosphorus iron at slightly under the domestic price. No. 2 foundry, 1.75 to 2.25 silicon, likewise is down $1 to $27.50 to $28, valley. Several lots, some involving from 300 to 500 tons, have gone at the minimum. This makes gray forge quotable at a minimum of $26.50, although one or two producers will not adopt $27 as yet. The Westinghouse Air Brake Co. closed on 150 tons of No. 3 foundry and the Westinghouse Electric & Mfg. Co. 300 tons of No. 2, 400 tons of No. 2X and 200 tons of No. 1X for its Cleveland foundry. It is understood that the latter iron will be delivered from a Cleveland blast furnace. Producers are confidently unanimous that a buying movement is not far distant. The Claire Furnace Co.'s stack will start to produce iron Thursday. The McKinney Steel Co. blew in its Scottdale, Pa., furnace which will furnish 6000 tons of iron monthly to a cast iron pipe producer there which has been obtaining its iron from Cleveland. The Clinton furnace likewise is understood to be making iron for a consumer connection.

Small-lot Buying Active

Cincinnati, Nov. 21.—While there still is a general sagging tendency in the pig iron market the decline appears to have been checked by a revival of inquiry and increased spot buying of small lots. An important consumer in central Michigan is in the market for 18,000 tons for early delivery. Prices are being asked on 13,000 tons of foundry, of which 3000 must be northern iron and 5000 tons of malleable. The prospective purchaser indicates that quick action will be taken in placing the order and shipments are to be started promptly and completed before the end of the year. Another Michigan inquiry is for 1000 tons of northern foundry for first quarter. A consumer in central Ohio has asked for prices on 900 tons for the same period. The National Cash Register Co., Dayton, O., is on the market for 250 tons for first quarter. Numerous other inquiries for early 1923 tonnages range from one car to 100 and

Extended Statistics of American Iron and Steel Production and Ingot and Casting Output, page 1452

200 tons. Prompt delivery inquiries include 300 to 500 tons of foundry iron for a consumer west of the Mississippi river, 250 tons for the Baltimore & Ohio railroad, 300 tons 7 per cent silvery for a Michigan melter and one car of 9 per cent silvery for the Whitaker-Glessner Co. There has been an increase of approximately 50 per cent in small lot buying. A consumer in central Ohio bought 300 tons of northern foundry for prompt delivery, which was done at $29.50, Ironton base. A Cincinnati melter took 100 tons of No. 2 southern foundry at $24, Birmingham.

Heavy tonnages are reported to have been sold in the Alabama district during the past week around $23 to $23.50, and that range is quotable for spot iron with $24, Birmingham base, the minimum quotation for first quarter delivery. In the southern Ohio district standard foundry iron is available at $29.50, Ironton base, and it is said that $29 has been done.

Buffalo Iron Sells Lower

Buffalo, Nov. 21.—No. 2 plain foundry, 1.75 to 2.25 silicon, for delivery east has been sold in this district as low as $26.50 within the past week, it has developed. The differential on No. 2X (2.25 to 2.75 silicon) is $27 and on No. 1X (2.75 to 3.25 silicon), $28. Another set of prices lists No. 2 plain at $27.75; No. 2X at $28.25 and No. 1X at $29.25. Another interest states its base is $28 for No. 2 foundry and malleable. Basic is listed at $27.75. The divergence of prices indicates the low line of inquiry out just now and the greater desire on the part of the furnaces for tonnage. At the same time one inquiry for 3000 tons was placed in the district and another inquiry for 3000 tons has been put out. Some special irons are being sold and sales of charcoal have developed the price of $36.28 Buffalo. The Rogers-Brown Iron Co. has placed another stack in blast.

Prices Still Are Soft

Boston, Nov. 21.—Further price reductions have recently been reported in this market and the tendency among buyers is to wait developments before placing orders either for prompt delivery or for first quarter. Buffalo iron is quoted at $27 furnace for the base grade or $33.91 delivered New England. The quoted differentials are $1 for each 50 silicon points, but most furnaces are believed to be willing to shade differentials on a round tonnage. Several of the eastern Pennsylvania furnaces are meeting the delivered price in New England from the Buffalo district, which means about a $28 furnace price eastern Pennsylvania. Foreign iron continues low for the eastern portion of New England but the margin between the delivered price of Scotch iron and domestic iron is gradually being diminished. Some difficulty in selling foreign iron has already been reported in the New York district where distress tonnage of Scotch iron has been offered as low as $27 duty paid on cars. The prevailing price for Scotch iron at Boston is $28.75 duty paid on cars. Both sales and inquiry during the week in New England have been mostly of small tonnage. The General Electric Co. at Pittsfield, Mass., is asking for 500 tons of iron for prompt delivery. Imports of iron at Boston during the week dropped sharply from the figures of the last three or four weeks when but 500 tons entered the port.

Future Buying Still Backward

New York, Nov. 21.—While demand for pig iron here has improved slightly, most of the buying for first quarter is held back. Current buying involves mostly prompt requirements. A good many consumers, in fact, have not enough iron to finish out the year. Inquiries out from such interests at present aggregate a few thousand tons.

Eastern Pennsylvania makers are holding firmly to $29, furnace, for the 1.75 to 2.25 silicon grade, plus $1 silicon differentials. The only shading has been to compensate for freight rate disadvantages. While the usual price on Buffalo foundry is $28, base, plus $1 silicon differentials, some Buffalo tonnage has been sold at $27. Virginia furnaces continue to obtain $32, base furnace, when they sell locally, but they find it necessary to quote lower to obtain business outside. However, $30, furnace, seems to be the minimum price done. Central Pennsylvania foundry has been sold at $29, base furnace, mostly to Pittsburgh and other middlewestern points, since the price is not competitive in the East. Alabama foundry iron has been sold in large volume during the past few days at $23 to $25, base Birmingham, mainly for shipment to northern and western points and also to consumers. Foreign foundry continues to be sold in this district. For English and Continental foundry equivalent to standard 1.75 to 3.25 silicon grades, for all deliveries, prices range from $26.50 to $27, duty paid, depending on the grade, size of tonnage, urgency of the seller or buyer, etc. On Scotch 2.50 to 3 silicon, prices range from $28.50 to $29.50, duty paid.

Southern Iron Sold At $23

St. Louis, Nov. 20.—Buying of pig iron is extremely slow, for spot shipment and forward delivery. While the melt continues on a large scale, and numerous melters have supplies sufficient only for the remainder of the year, they seem indifferent as regards future requirements. Several leading selling agencies report that they have not a single order on their books for the first quarter. The general belief among consumers is that the recent price reductions are only a beginning, and that before the middle of December another cut will be made. The chief reasons given for this view are the recent decline in coke, improved transportation service and heavier production by the furnaces. Actual sales reported during the past several days total less than 800 tons, the largest being 300 tons of southern iron, to a stove manufacturer. While none of the representatives of southern furnaces here will admit having sold at $23, it is known that transactions were made at that figure and more iron

can be had on the same terms. Northern iron still is quoted at $31 Chicago, and the leading local producer is asking $31 to $32, f.o.b. Granite City.

Prices Continue to Settle

Cleveland, Nov. 21.—Large consumers of pig iron who are in imminent need of sizable tonnages are more active in trying to discover weak spots in the market, but the level at which buying on a large scale may be confidently expected apparently has not been reached. Lower prices continue to be developed on comparatively small lots, and some sellers today admit that less than $27, valley, can be done on desirable tonnage The American Radiator Co., has not closed on an inquiry for 1000 tons of iron for delivery this year to Detroit and Springfield, O., plants. This interest is generally reported here to be feeling out the market in contemplation of much heavier buying, it being understood in the trade that it would take 50,000 tons, at a satisfactory price. Some consumers have mentioned $26 as the price at which they might buy, without giving specific assurance they would close at that figure. On inquiry from the Westinghouse Electric & Mfg. Co., for 1250 tons made up of three grades for delivery to its Cleveland plant, a lake furnace made an offer of slightly less than $28, base, valley, equivalent to around $29.50 delivered. This tonnage is reported as having been closed with a valley interest at less than $27, valley basis. A lake furnace sold a tonnage for delivery to an Ohio consumer on a basis of $28, valley. For Cleveland it is asking $31, delivered. Another lake furnace has reduced its price 50 cents to $29.50 to $30, furnace, or $30 to $30.50 for delivery in Cleveland. The Warren Foundry & Machine Co. is inquiring in this market for 15,000 tons of iron for next quarter for its pipe plant at Phillipsburg, N. J. The American Car & Foundry Co., is asking for prices on 3000 tons of iron, including No. 2 and malleable, for its Detroit plant for this year. An inquiry is current for 1500 tons of iron for a Port Huron, Mich., consumer.

Nothing further has developed in basic. On the inquiry for 5000 to 10,000 tons for a Canton, O., consumer, a lake interest quoted $28, valley, equivalent to $29.50, delivered. The consumer is understood to have closed for 5000 tons with another maker.

Selling for First Quarter

Birmingham, Ala., Nov. 20.—Considerable pig iron has been sold by smaller furnace companies of this district on a basis of $24 for No. 2 foundry. One company is practically sold up for the first quarter, while another probably will withdraw before the end of this week. Further reports are current as to buying, pipemakers having placed orders for round tonnages. The Alabama Co. has booked considerable tonnage into the first quarter of next year and many inquiries are being received. The Birmingham Machine & Foundry Co. recently purchased a little tonnage at $25. Production is being maintained, and consumption is not being reduced.

Coke Lower; More Buying

Beehive Furnace Fuel Now $6.75 to $7.25—Additional Tonnages Closed—Spread on Foundry Grade Narrows in Dull Market

COKE PRICES, PAGE 1382

Pittsburgh, Nov. 21.—Beehive furnace coke again has receded 25 cents per ton, now being quoted at $6.75 to $7.25, although some producers still maintain quotations from $7.50 to $8, ovens. The spread on the foundry grades is narrower, since different grades on which $9 formerly was quoted now are available at $8.50, making the market on 72-hour fuel quotable at $8 to $8.50. Some high price contracts for the furnace fuel still are being worked off, carrying figures from $8 upward through December. Interest in foundry coke now is negligible, small lot buying continuing from week to week, chiefly in single carloads to 2000 or 3000 tons at a time. A number of tonnage inquiries for 48-hour fuel, as well as sales are noted. The A. M. Byers Co. is reported to have closed on 15,000 tons for December at around $7.25. The Claire Furnace Co. recently bought 5000 to 6000 tons of high grade furnace coke at $7.25 for the remainder of November after which time its coke affiliation will be producing enough for its requirements. The Reading Iron Co. closed on a large tonnage for the needs of one of its blast furnaces at under $7. The Pittsburgh Steel Co. will buy in 50 or 100 carload lots for a period. A coal and coke broker is circulating an inquiry for 50 carloads of furnace coke daily, wanted for a furnace now in blast. One or two other inquiries are out for December coke for blast furnaces in operation. One or two of the latter may buy for a longer period. A middle interest is offering coke with sulphur content of about 1.15 to 1.20 at $6, ovens, which it claims is suitable for some blast furnace practice. Heating coke is selling around that figure, while up to $9, ovens, has been paid by yard dealers for domestic coke on which the demand lately has been active. Production, according to the *Connellsville Courier*, for the week ended Nov. 11, was 176,880 tons as compared with 164,320 tons the preceding week.

By-product Price Firm

Boston, Nov. 21.—Despite the softening of Connellsville quotations, the by-product foundry coke price holds firm at $16, delivered in New England, on contract. The Providence, R. I., and the Everett, Mass., plants are behind on shipments. Demand for coke for domestic purposes is insistent, and this together with difficulty in securing cars has slowed up deliveries to foundries.

Spot Purchasing Continues

New York, Nov. 21.—Although demand for coke here is better, prices are slightly lower. Purchasing continues entirely for prompt shipment. There is no tendency to buy ahead. The strange situation, in which all consumers in New England have covered for their requirements over the first half of next year, while all consumers here are uncovered beyond Jan. 1, continues to exist. The price of standard beehive foundry coke ranges from $8.50 to $9, Connellsville. On by-product foundry coke the price ranges from $12.84 to $12.91, delivered at northern New Jersey points.

Shipments Still Retarded

Cincinnati, Nov. 21.—Coke shipments are held back by an extreme car shortage. While there is a larger demand and better buying, the movement from ovens is retarded and consumers' stocks are low. The market is barely steady, with declines in some prices. Smelting and refining interests are coming into the market with increased tonnage requirements. One local dealer has placed 20 cars with these interests, and a contract was closed with a Michigan consumer for 40 cars. A consumer at Dayton is in the market for 250 tons of foundry fuel for first quarter delivery, and there are inquiries for 100 and 200 tons, respectively, for central Ohio foundries.

St. Louis Market Strong

St. Louis, Nov. 20.—In sharp contrast with the easier coke situation in the East and a dull market for coal, coke in this district continues in excellent demand and strong. The improved movement from the East and increase in by-product production have not yet filled all needs. The demand is particularly strong for coke for industrial purposes, and the by-product interests report they are unable to fill all their orders for domestic sizes. Prices hold firm, the leading east side by-product producer still quoting $14 f.o.b. Granite City. Continued mild weather has played havoc with the coal market. Users of steam coal are holding off for further price concessions but the operators seem determined not to cut their quotations. Dealers' yards are filled almost to capacity. Terminal congestion in St. Louis has been relieved considerably, especially on westbound lines.

Furnace Coke $7 to $7.50

Birmingham, Ala., Nov. 20.—Orders for coke are being booked by southern producers and the market here is considered fairly good. Average quotations are around $8 to $8.50 for foundry coke and $7 to $7.50 for furnace fuel. Beehive and by-product ovens are producing at a steady rate. Furnace interests are taking a large amount of coke. With the exception of the surplus coke at North Birmingham, belonging to the Sloss-Sheffield Steel & Iron Co., there is very little tonnage now on yards in this district. Pitch coke is commanding $12 a ton. Two hundred beehive ovens at the Virginia mines are being used to make this grade.

Voluntary petition in bankruptcy has been filed by the Royal Machine & Foundry Co., Oshkosh, Wis., manufacturing bottle capping machines and other mechanical specialties. The liabilities are $26,321 and assets are $62,770, of which $32,761 is machinery, tools, etc.

New Bar Buying Is Light

Shipments Are Interrupted by Embargoes—Automobile Builders Still Active—First-Quarter Price Made by Chicago Independent

BAR PRICES, PAGE 1382

Chicago, Nov. 21.—Bookings of a leading local mill including those in steel bars were heavier last week, but this was accounted for by the receipt of specifications against a number of rail contracts. There was an actual decline in strictly new tonnage. Steel consumption shows no abatement and in fact would be greater if the mills could furnish the material. Prices are generally firm and no changes are expected. The leading independent now is accepting orders for first quarter in bars, plates, shapes and sheets at its fourth quarter quotations. Owing to its heavy rail and track supply commitments, the tonnage which it has to sell is not large and will probably be allocated among regular customers. The demand for soft steel bars comes from a diversity of users, including railroads, car builders, the automotive industry and reinforcing bar sellers. Implement manufacturers also are becoming more of a factor in the market and report an unusually active demand for small implements from the South. The principal producer continues to quote 2.00c Chicago mill, and the leading independent 2.10c Chicago.

Bar iron remains firm at 2.50c Chicago mill, but business is still in small volume.

Demand for hard steel bars is sufficient to enable mills to maintain operations but is not large enough to increase backlogs. The market is firm at 2.00c Chicago mill.

Buying Is Unabated

Pittsburgh, Nov. 21.—While new buying of merchant steel bars and specifying against old contracts continues unabated, shipments are interrupted by embargoes, car shortages, etc. The Pennsylvania railroad was a recent bar purchaser of size. It took several lots each involving several thousand bars. Other users await a price announcement from the Carnegie Steel Co., as to the figure for the first quarter before placing any definite contracts. While no clear expression is made by that interest as to a price for that period, it is understood the present level of 1.90c will continue in effect or that if an advance is inaugurated it will not exceed $2 per ton. Spot buying of small lots involving a carload or more is being negotiated at 2.00c to 2.10c, base Pittsburgh. The situation as regards refined iron largely is unchanged with quotations current of 2.60c to 2.75c, base Pittsburgh.

Automobile Buying Being Done

Cleveland, Nov. 21.—Reports continue to be heard of automobile companies closing contracts with manufacturers in this district for parts for delivery after Jan. 1 and also of some orders for steel being closed by the builders direct, notably in sheets. However, the bar market has not yet reflected much placing of 1923 business against automobile operations for next year. Some tonnage in forging bars has been closed for that position. It is pointed out that the placing of additional bar business with several of the mills for earliest delivery actually means next year's shipment because of filled order books. More activity from the automobile end of the market is expected in the near future. In all quarters new bar buying is light and the market is quiet. Consumers are pressing for delivery against former orders rather than placing new tonnage. Prices are steady around 2.00c, Pittsburgh.

Order Rate Is Fair

New York, Nov. 21.—Steel bar buying, while far from brisk, keeps up well as compared with demand for some other finished lines. The price generally continues 2.00c base Pittsburgh. Reports of sales at lower prices have had a disturbing effect in some quarters. It is found, however, that the business under 2.00c involved odd lots in stock.

Demand Is Smaller

Philadelphia, Nov. 21.—Steel bar demand lacks the volume of a few weeks ago. Large tonnages are lacking but the total volume of business is fair, although orders do not equal shipments. Reports of price shading are unverified, and 2.00c, Pittsburgh, still appears the minimum. Spring steel is quoted 2.15c to 2.25c, Pittsburgh.

Cold-Drawn Buying Sustained

Pittsburgh, Nov. 21.—Demand for cold-drawn steel bars shows no sign of a letdown. Some buying is withheld but if the transportation situation could be bettered, operating schedules among producers would be increased. At present, plant operation is approximately upon a 70 per cent average basis in this district with car, steel and labor supply slightly increased. The removal yesterday of its embargo for three days by the Pennsylvania railroad will not only increase shipments of the finished product but will increase the supply of steel to the finishing plants. Because some makers have been booking orders at a heavier rate than shipments have gone out, some have enough business on hand to carry them two-thirds or more through the first quarter although the books have not been officially opened for that period. The automotive industry continues active in furnishing specifications and the volume of business from other consuming lines is good. Quotations are unchanged on the basis of 2.50c to 2.75c, base Pittsburgh. It is pointed out however, that often the 2.50c price means a loss since with deliveries of certain sizes of merchant steel bars on contract at 1.90c are deferred from four to six weeks, and replacements have to be made at 2.10c or 2.15c to maintain the $12 per ton conversion cost, would create a 2.75c price for cold-finishing.

Book First Quarter Hoops

HOOP PRICES, PAGE 1382

Pittsburgh, Nov. 21.—While some fourth quarter business in hoops and bands probably will be carried into the first quarter bookings have started for shipment in that period. These mainly are on the basis of 1.90c, base Pittsburgh, the price which has prevailed during the present quarter, although some of the narrower sizes and thinner gages still bring 3.00c. Various consuming lines are represented, automotive, toy, hardware, etc. Single carloads rule although occasionally larger tonnages are noted. Operations are on a 70 or 80 per cent basis, being hampered somewhat by the transportation situation.

New Bolt, Nut and Rivet Orders Are Small

NUT AND BOLT PRICES, PAGE 1446

Pittsburgh, Nov. 21.—Inquiries for first quarter supplies of nuts, bolts and rivets are being circulated. Producers generally have not quoted but the impression is conveyed that when they do prices will show no change from present levels. Railroads as well as railroad car and locomotive repair shops are inquiring for fairly large tonnages of rivets, bolts, etc., and other large users are offering to make arrangements subject to a definite price to be announced later. The usual negotiation is for 50 to 200 tons, although occasionally a 300 or 500-ton lot is considered. While the car supply is better than it was a week ago, steel receipts are spotty.

Consumption Is Heavy

Chicago, Nov. 21.—Specifications for nuts and bolts have fallen off but sellers are holding firmly to the September discounts and believe that business will show a revival at the first of the year. The approach of inventory-taking has caused consumers to postpone additions to present stocks. There is no decline in consumption; in fact the automobile industry is running better than ever before at this season. One plant in this vicinity has exceeded all production records thus far this month.

Slight Gain in Orders

Cleveland, Nov. 21.—A slight gain in orders and specifications for bolts and nuts during the past week is reported by makers in this district. However, new business is not large and practically all orders are against old contracts. Prices are steady at the established levels. There has been no contracting for first quarter as yet. Rivet demand is fair but new business is small. Practically all orders are against contracts placed at lower prices than those now asked on spot business. During the past few days the leading maker here reports it has been in receipt of several large inquiries.

Ore on Hand Exceeds 1921 Tonnage by 5,000,000

ORE PRICES, PAGE 1446

Cleveland, Nov. 21.—Iron ore on hand at furnaces and Lake Erie docks Nov. 1, 1922, amounted approximately to 5,000,000 tons more than the tonnage in 1921. The Lake Superior Iron Ore association gives the following data re-

lating to tonnages of ore consumed and on hand.

	Tons
Ore consumed in September.....	2,989,545
Ore consumed in October.....	4,012,000
Ore consumed in October, 1921.....	1,833,000
Ore on hand at furnaces Nov. 1, 1922	34,595,000
Ore on Lake Erie docks Nov. 1, 1922	9,586,000
Total on hand at furnaces and Lake Erie docks Nov. 1, 1922	44,181,000
Total on hand at furnaces and Lake Erie docks, Nov. 1, 1921	39,071,000

The market for ore is exceptionally dull, a few inquiries current being for small tonnages, the total probably not exceeding 20,000 tons. The majority of operators have completed their shipments for the season.

Sees Congo as Ore Center

New York, Nov. 21.—E. M. Newman, travel lecturer, who returned recently from a trip to Africa, says that the Belgian Congo promises to be the greatest mineral producing country in the world. He states that there are great deposits of coal, copper, silver, tin and radium. He says he was told by English engineers that there is coal enough in the Belgian Congo to supply the world for centuries. The copper ore is rich, he says. There has been active development of the various deposits, Mr. Newman said, and as soon as better transportation is provided, shipments from the Belgian Congo should be of great importance in affecting prices throughout the world.

Less Sand Produced

Washington, Nov. 21.—Molding sand produced and sold in the United States in 1921 totaled 1,906,977 net tons valued at $2,451,966, compared with 5,128,075 tons valued at $7,504,759 in 1920. The average received at the pit in 1921 was $1.29 per ton, against $1.46 in 1920. In volume, 1921 production was 63 per cent below that of 1920. Ohio, Illinois, New York, Pennsylvania, New Jersey and Indiana supplied 83 per cent of the production. The geological survey gives the price per ton at the pit in 1921 in Ohio as $1.78, in Pennsylvania, $1.58, in New York $1.55, in New Jersey $1.27, in Illinois $1.14 and in Indiana 43 cents.

Coast Firm Reorganizes

Reorganization of Eccles & Smith Co., machinery dealers with warehouses in San Francisco and Los Angeles, is announced. The new organization has, for its executive officers: Philip Rowe, president of the Hallidie Machinery Co., Seattle; Chris Eccles, one of the founders in 1900 of the Eccles & Smith Co.; R. W. Baxter, a railroad and traffic expert; W. E. Ringwood, for 16 years associated with Harron, Rickard & McCone Co., and Frank T. Sweeney, who for 16 years has been prominently identified with the Eccles & Smith Co.

October business for the Chicago Pneumatic Tool Co., Chicago, was the largest for any single month since 1918, it is reported.

Tank Plate Needs Heavy

Oil Fields, Boats, Cars, Locomotives and Tanks Require Sizable Tonnages—Buying Confined Mostly to Small Lots—Prices 1.95c to 2.00c

PLATE PRICES, PAGE 1382

Chicago, Nov. 21.—A total of 38,453 cars is on current inquiry on which local mills have granted protections and when these are placed a total of 360,000 tons of plates, shapes and bars, as well as 148,000 axles, will be added to the present commitments of producers. Pending protections on oil storage tanks total 10,000 tons. The outer drive now being constructed in Grant Park, Chicago, will require 15,000 tons of bars, structurals and plates. The Inland Steel Co. is now taking orders for first quarter delivery at 2.30c mill, but otherwise the price situation is unchanged. Eastern mills occasionally take some orders in this territory for nearby delivery at 2.00c, Pittsburgh.

An inquiry for 12,000 tons for tank construction at Casper, Wyo., has been issued by the Standard Oil Co. of Indiana. This buyer has placed 850 tons for stills and other purposes at Casper, with the Midvale Steel & Ordnance Co.

Tonnage of Moderate Volume

New York, Nov. 21.—The leading plate business here during the past week involved 800 tons for four tanks for the Mexican Petroleum Co. at Carteret, N. J. These are to be fabricated by the American Bridge Co. While there is a fair volume of new business, it consists mostly of small orders and there is not enough tonnage to go around. Most of the current business is going at 2.00c, base Pittsburgh. More attractive lots in some cases are going at 1.95c.

The Tidewater Oil Co. is taking bids on two barges involving 600 tons of steel. The American Locomotive Co. is understood to have placed a fair tonnage of plates and various reports are afloat as to the price paid.

New Business Is Small

Cleveland, Nov. 21.—A relatively small tonnage is represented by the current new business in plates. Considerable tonnage remains to be disposed of for oil field and refinery work, bids on which have been asked over several weeks and several boats still being figured by lake yards. Plate prices have not been as steady as either bars or shapes, 1.95c, Pittsburgh, having been recently done in this district as previously reported. A car builder inquiring for 5000 tons of plates and other plain material, however, apparently has been unable to develop less than 2.00c, Pittsburgh. The latter despite some deviations, remains the representative quotation of the market.

12,000-Ton Inquiry Out

Pittsburgh, Nov. 21.—Once again inquiries for tanks are to the forefront in the plate market. Several of these are in the preliminary stages although one has progressed further and now is about to be closed. While the identity is withheld, it involves 12,000 tons of plates. The other inquiries call for 5000 to 10,000 tons each. Smaller sized lots of plates continue to be booked from time to time, usually at 2.00c to 2.10c, base Pittsburgh, although 2.15c to 2.25c has applied in connection with single carloads offered other than regular customers. Much conjecture is centered upon what the Carnegie Steel Co. will do as regards a price for the first quarter. It has not named a figure as yet but probably will reaffirm a figure around 2.00c. Considerable tonnage will doubtless have to be carried over from this present quarter since shipments have been greatly interfered with by transportation difficulties. A small tonnage of plates is involved in current transmission tower inquiries which call for a fairly large quantity of structural shapes.

New Tonnage Is Limited

Philadelphia, Nov. 21.—Orders are expected to be placed tomorrow by the Reading railroad for four car floats and two ferryboats involving 1900 tons of plates. The Baldwin Locomotive Works is placing some tonnage. Otherwise the current demand for plates is of a routine character. Eastern mills are not operating over 15 per cent of capacity and find difficulty in maintaining the present rate. Rumors of price shading cannot be verified and the market appears to be 2.00c, Pittsburgh on the general run of business and 1.95c on the more attractive lots.

New Wage Raise Unlikely, Steelmakers Say

Youngstown, O., Nov. 21.—Rumors of a wage advance for common labor are discounted by leading independent steelmakers. They point out that the labor supply is now more plentiful as outdoor labor is returning to the mills. They also say that the present uncertainty of the iron and steel market and unsettled producing costs are making a wage advance unlikely.

"We have not enough business in sight for 1923 to warrant an increase in wages at this time," said one prominent steelmaker. "Which would the men prefer, steady work at present wages or uncertain and less work for higher wages?"

Buys Chicago Foundry

The James A. Brady Foundry Co., Chicago, has been purchased by Ohio interests headed by L. A. Griffith of the United Machine & Mfg. Co., Canton, O. It is understood Mr. Griffith will be president of the new organization which will be formed to operate the plant.

The Low Moor Iron Co. blew in one of its furnaces at Low Moor, Va., Nov. 6. This stack is operating on foundry iron.

Scrap Prices Go Lower

Further Reductions Made in Most Grades—Consumers Continue Out of Market—Rail Delays a Factor—Only Small Sales Active

SCRAP PRICES, PAGE 1450

Chicago, Nov. 21.—In the absence of consumer buying, scrap is still weak and a considerable number of grades have again declined 50 cents or more per ton. Users, generally, propose to bide their time until the first of the year as they have enough scrap bought for immediate needs and do not wish to add to their inventories. Accumulations of prepared scrap in the yards of dealers have been well liquidated, but there is a steadily increasing inflow of unprepared material from car repair shops and both sorted and unsorted scrap from the railroad and industrial shops. With the available supply of scrap increasing and buying at a minimum, further price recessions are looked for. Railroad offerings include the Rock Island, 4000 tons; the Wabash and the Grand Trunk 3000 tons each; and the New York Central a blank list.

Pennsylvania Still Is Buying

Boston, Nov. 21.—The buying of steel scrap in this district by Pennsylvania consumers still continues and furnishes the only real life in this market. Shipments to Pittsburgh, while individually small, have totaled a round tonnage during the past week. The price has averaged between $14.25 and $15 shipping point for heavy melting steel. Chemical borings, which have held up remarkably well throughout the fall, finally have softened as the demand from New Jersey and New York state consumers has at last subsided. The high price of $19 which was reported in some cases a week ago has disappeared. Recent sales have been between $16 and $17 shipping point. Rolling mill borings are offered at $12 but sales are few. Cast scrap in all grades continues sluggish, but prices show little change compared with a week ago. Stove plate has exchanged hands at $16 delivered. A slight increase in buying among dealers for speculative purposes is reported by one of the leading interests.

Grades Again Marked Lower

New York, Nov. 21.—Continued sluggish demand, in conjunction with the weakness in pig iron, is again forcing scrap prices downward. Five grades within the past week have slumped off at least 50 cents, including borings, turnings, heavy and machinery cast. The Bethlehem Steel Co. is virtually the only important eastern buyer of heavy melting steel, while in western Pennsylvania, several interests are closing with dealers in this district, although embargoes on the Pennsylvania railroad are interfering materially with shipments. Cast scrap is being bought sparingly, a number of the foundries in this district being practically out of the market, while in wrought scrap demand is even less active.

Business Mostly Small Lots

Philadelphia, Nov. 21.—Fair scrap sales involve only small lots. Large transactions are lacking. Steel works are reported to have received heavy shipments of steel scrap recently. One mill requested dealers to halve its shipments as the railroads threatened embargoes. Prices are lower.

Dealers Still Cover Shorts

Pittsburgh, Nov. 21.—Buying from scrap dealers by dealers who still need tonnage to apply on orders received a few weeks ago from a local steel interest alone constitute the market. This consumer apparently is charging from railroad cars and then using the cars for steel shipments outbound; it therefore is calling for more prompt deliveries since the cars are badly needed. Because buying upon these orders still continues, the depleted condition of scrap yard stocks generally is indicated. Further transactions were noted late last week and the first of this in which up to $20.50 was paid for heavy melting steel. The market therefore, still is quotable at $20 to $20.50. Weakness continues to characterize the Mahoning valley market as well as the eastern Pennsylvania field. Steel scrap in the valley is lower than at Pittsburgh, thus re-

(*Concluded on Page 1401*)

Sheet Bars Go Below $38

General Level Remains at That Figure, though Tonnage Is Taken at $37.50—Buying of Semifinished Material Still Slow

SEMIFINISHED STEEL PRICES, PAGE 1382

Pittsburgh, Nov. 21.—Inquiry is being made quietly for first quarter supplies of sheet bars, billets and slabs. While the market is clarified to the extent of sales made by one Ohio interest at $38, Youngstown, other producers still are maintaining a nominal quotation of $40, Youngstown. The latter have no tonnage available for shipment this year and they are not yet ready for first quarter bookings. Trade authorities believe that at present if any lower prices than $38, Youngstown, are available the minimum would be $37.50 for large tonnages. Some forging billets have been sold in lots up to 200 tons each, and as high as $47.50, Pittsburgh, has been obtained. As low as $42.50, however, has been quoted by one interest in this

Wire rod business continues to be refused by makers who need the rods in their own finishing departments. While single carloads have sold at $50, Pittsburgh, $47.50 is considered the general market since $45, the price of the American Steel & Wire Co., is nominal, the American company being booked up for some time. It is starting its rod mill this week at Farrell, Pa. The Carnegie Steel Co. continues out of the market although within the next few weeks its regular customers doubtless will make their arrangements for first quarter tonnages. Many items on which shipment has been delayed because of the car shortage and other transportation difficulties will be carried over to the next quarter. Skelp inquiries are rare although one or two tube manufacturers are said to be sounding the market. From 2.00c to 2.15c, base Pittsburgh, is the general market. Some prices up to 2.50c are heard, but these apparently take account of size extras.

Tonnage Sold At $37.50

Youngstown, Nov. 21.—Sales of semifinished material in this district are difficult to locate. The most recent sale involved 2000 tons at $37.50, Youngstown, for consumption in the Pittsburgh district. In view of last week's sale of approximately 10,000 tons of billets, slabs and sheet bars, which was consummated at $38, Youngstown, by an outside producer, it is doubtful whether less than this price can be obtained from valley makers at present. No large inquiry for sheet bars is up for negotiation at the moment and it, therefore, is hard to forecast what the market may do under pressure. Meanwhile the market for billets, slabs or sheet bars is quoted at $38, Youngstown.

Maintains Price of $38

Cleveland, Nov. 21.—The northern Ohio interest which last week booked around 10,000 tons of sheet bars, billets and slabs at $38, Youngstown, still maintains that figure as its price, but has not taken additional tonnage. Some inquiries are current in this district, including one from the American Steel Co., for 5000 tons of tin bars, as reported from Pittsburgh.

Forging Billets Are Placed

Philadelphia, Nov. 21.—The American Locomotve Co. has placed 1300 tons of forging billets with eastern makers but the price is unknown. Otherwise billet business in the eastern territory is made up of only small lots of rerolling steel at $40, Pittsburgh, and of forging material at $45 and $47.50, Pittsburgh. Rerolling billets probably could be bought at $38 Pittsburgh for attractive tonnages. Pressure continues to be exerted for wire rods which remain at $45 to $50, Pittsburgh.

Demand from Warehouse Fair; Prices Hold

WAREHOUSE PRICES, PAGE 1442

New York, Nov. 21.—Prices on iron and steel out of warehouse are unchanged, although an advance in galvanized sheets is expected shortly due, in part, to the increased strength of spelter. Trading so far this month compares favorably with business in October. Virtually all lines are moving well.

Demand Is Maintained

Philadelphia, Nov. 21.—Demand for iron and steel products out of stock is well maintained being from 80 to 85

per cent of what is considered normal. While structural shapes are in largest demand orders for other classes of material are fairly heavy.

Some Products Scarce

Cleveland, Nov. 21.—While orders for iron and steel products out of warehouse continue fair, the total volume of business in November will fall below that of October according to several leading jobbers. However, this is not due to any slackening in demand but is accounted for through jobbers' inability to furnish certain products. Prices are unchanged and firm.

Strip Bookings Heavier

STRIP PRICES, PAGE 1382

Pittsburgh, Nov. 21.—While a week or two ago makers of hot and cold-rolled strip steel thought they were in the midst of a lull, this condition has been superseded by a period of heavy buying. Some of the tonnages are for shipment during December, January and February, while in a few January, February and March requirements are covered, so that the books now can be said to be opened for the first quarter at the present prices of 2.90c minimum on hot-rolled and 4.50c, base Pittsburgh, on cold-rolled. On the basis of present operations, the average being 75 or 80 per cent, considerable fourth quarter tonnages will be carried over for shipment early next year. Makers easily could operate 100 per cent if car, steel and labor supplies were normal and if the railroads could render effective service. Makers of strip steel generally prefer not to pile their product during embargoes and are keeping away from heavy stocks. Demand is more diversified than ever coming from practically every consuming line.

Seek Aid of Industry in Drafting Specifications

In order to hasten elimination of the differences between specifications for government purchases and the usual practice of commercial suppliers, the American Engineering Standards committee has appointed a standing committee on co-operation with the federal specification board. The work carried out under the general direction of this committee is expected to give industry a better opportunity to participate in the development of specifications for government purchases. At the same time, it will bring to the government in a greater degree than has been possible heretofore, the talent of the 200 industrial organizations co-operating in the work of the American Standards committee.

The members of the committee on co-operation with the federal specifications board are: Chairman, A. H. Hall, assistant treasurer and superintendent of distribution, Central Union Gas Co., New York. John A. Capp, Chief of the testing laboratory, General Electric Co., Schenectady, and Sullivan W. Jones, chairman of the structural service committee, American Institute of Architects, 19 West Forty-fourth street, New York.

High Grade Sheets Urgent

Some Consumers Asking Mills To Double Shipments—Prices on Black Weak—American Company's Quotations Still Awaited

SHEET PRICES, PAGE 1382

Pittsburgh, Nov. 21.—Deferred until later in the week, the price announcement on sheets for the first quarter by the American Sheet & Tin Plate Co., is awaited with keen interest. The market on black sheets in the past few weeks has weakened considerably. One Ohio mill recently entering the market has been quoting 3.25c, base Pittsburgh, as against the regular market price of 3.35c. A Pennsylvania mill has been endeavoring to collect black sheet tonnage for a backlog, and has offered concessions. The tendency to go below the regular market does not apply to galvanized sheets, due possibly to the higher prices prevailing upon spelter. The minimum on galvanized is 4.35c, base Pittsburgh, and due to higher producing costs it is expected that if any change is made by the Steel corporation in the way of a price advancement, it will be confined to galvanized sheets. One or two sheet producers still maintain higher levels by $2 to $3 per ton than the prevailing market prices. The American company remains out of the current market having its output obligated through January and February, and on certain items for a portion of March, based on present operating rates. During the past week it made another advance in hot mill operation going from 72 to 74 per cent. Blue annealed sheet specifications and orders continue to be filed intermittently and while some makers are quoting 2.50c, the same as the American company, others are maintaining a 2.65c level. Automobile sheets continue quotable at 4.70c to 5.00c, base Pittsburgh, with an uninterrupted demand.

Prices Softer at Buffalo

Buffalo, Nov. 21.—Sheet prices are easier and some lower figures are being quoted. The Steel corporation's prices, however, remain 3.35c for black and 4.35c for galvanized.

Special Grades in Demand

Youngstown, O., Nov. 20.—Interest in the sheet market at present is confined largely to pickled and full pickled stock. During the past two or three days, however, orders for black have been coming out more freely although the tone of this market still is decidedly dull. Black, No. 28 gage, now is quoted at 3.35c, Pittsburgh, by all makers in this district. Demand for galvanized also has tapered off. Some producers are quoting this grade at 4.50c in view of the high cost of spelter; other makers, however, have dropped to 4.35c, base Pittsburgh, stating that any figure higher than this fails to get business.

The full strength of the sheet market lies in the fine finished grades. Michigan consumers are inquiring for first quarter automobile sheets and in many instances are asking mills to double their fourth quarter requirements. Some substantial tonnages of full finished sheets for first quarter shipment have been placed. The price of 5.00c, Pittsburgh, for No. 22 gage will apply on December deliveries and may also apply during the following month. An announcement concerning the future price in this direction is expected this week.

Black Grade Is Shaded

Cleveland, Nov. 21.—Concessions in sheet prices have appeared in recent business in this district but have been confined strictly to the black grade. This shading which is attributed to independent mills is understood to amount to $1 a ton below the Steel corporation price or to a basis of 3.30c, Pittsburgh. Four mills are reported to have made this price on a certain piece of business. Galvanized sheets are firm at 4.35c, Pittsburgh. Blue annealed also shows no softening and recent sales at 2.60c, Pittsburgh, are reported as against the price of 2.50c, Pittsburgh, of the leading interest.

Maintains Prices for First Quarter

Chicago, Nov. 21.—The Inland Steel Co. has opened its books for sheets for the first quarter and is taking orders at the same prices which it has previously quoted, namely, 2.50c, Pittsburgh, for blue annealed, 3.35c for black and 4.35c for galvanized. A number of eastern independents continue to take some prompt business in this market at the same prices.

Wait for First Quarter Prices

Philadelphia, Nov. 21.—New sheet demand here is slow compared with two weeks ago. Current buying is restricted to prompt lots. The trade generally is awaiting the announcement of prices for the first quarter by the leading interest before taking action. Blue annealed is 2.60c to 2.75c, Pittsburgh, most of the business going at 2.60c. Black sheets are 3.35c and galvanized 4.35c, Pittsburgh.

Tin Plate Lots

Continue To Be Taken By Can Makers —Expect Price Revision

TIN PLATE PRICES, PAGE 1382

Pittsburgh, Nov. 21.—Specifications continue to come in to tin plate producers in this territory, principally from large can makers and largely for use in the northwest for salmon packing. Many of these specifications come in for shipment after Jan. 1, subject to a price to be announced later. This price announcement from the American Sheet & Tin Plate Co., expected for some time past, possibly may be issued during the present week. The present price is $4.75 per base box of 100 pounds, Pittsburgh. From a single carload up to several hundred tons at a time is the usual order while the larger can makers are specifying still larger tonnages. Stocks in the hands of tin plate producers, can makers, and packers, are not large and therefore there is no reluctance to take in shipments between now and the first of the year.

Slump of Awards Slight

Eastern Shape Mills Unable To Keep Up Operations Due to Lessened Demand—Chicago Reports Almost 100,000 Tons Active or in Sight

STRUCTURAL SHAPE PRICES, PAGE 1382

Washington, Nov. 21.—The seasonal decline in structural steel awards is reflected in the October report of the bureau of census which places the month's sales at 121,763 tons or 54.9 per cent of capacity of the fabricators reporting, as against 136,587 tons or 61.6 per cent in September.

In the October report the bureau gives revised figures back to last March when the Bridge Builders and Structural society, which formerly had compiled the monthly figures, went out of business. According to the revised figures, 140 fabricators now report their awards. Their total shop capacity is 221,790 tons.

The revised statistics and the others for the past year are as follows:

Month	Per cent	Tonnage
October	54.9	121,763
September	61.6	136,587
August	64.7	143,515
July	64.0	141,907
June	69.1	153,278
May	77.7	172,260
April	86.5	191,805
*March	77.0	139,300
*February	43.5	78,700
*January	40.0	72,100
*December, 1921	40.0	71,500
*November	55.5	99,800
*October	54.0	97,800

*Report of Bridge Builders and Structural society with entire country's fabricating capacity estimated at 180,000 tons.

See 97,000 Tons Ahead

Chicago, Nov. 21.—Active building operations in and around Chicago will mean the addition of fully 30,000 tons to mill bookings. Other work which is expected to develop before February will call for approximately 67,000 tons. Outstanding projects include a bridge over the Missouri river at St. Charles, Mo., requiring 10,000 tons, and the west side power station of the Commonwealth Edison Co., Chicago, 8000 tons. Plain material prices are unchanged.

Reported Awards Are Negligible

Pittsburgh, Nov. 21.—Structural shape awards this week are negligible, involving 30 to 100 tons each although occasionally a 200-ton job is noted. Action on the 6500 tons of shapes and plates for the Fortieth street bridge, Pittsburgh, may be hurried this week. Bids closed yesterday. Some ordering of structural shapes for fabricators' stocks usually is done in conjunction with orders for shapes for specific jobs which are filed against existing contracts. Spot buying is bringing figures from 2.00c to 2.15c, base Pittsburgh. Several thousand tons of shapes are involved in current inquiries for transmission towers, the identity of the buyers being withheld.

Few New Jobs Out

New York, Nov. 21.—While a number of substantial structural projects are contemplated, some of which have been in prospect for several weeks and are likely to develop into actual inquiries in the near future, fabricators report few new sizable jobs have come up for figures within the past week. However, enough business already is being estimated to give the market, along with orders coming through, an unusually active aspect for the season. Operations at most fabricating shops are being maintained and in some cases are only limited by difficulty in getting shipments through from the mills. Prices, at the same time, are steady, this applying to both fabricated steel and shapes.

Contracts Total 3700 Tons

Cleveland, Nov. 21.—Awards reported in this district this week involve 3700 tons. The Collinwood high school, this city, requiring 1500 tons, went to the King Bridge Co. A plant for the Michigan Steel Corp. at Detroit, 1200 tons, was placed with an unidentified fabricator. After having been postponed, the temple for the Tifereth Israel congregation, Cleveland, was revived during the week and placed with the Republic Structural Iron Works. It involves 1000 tons. It is understood that 2000 tons, on which local interests were figuring for a coal conveyer for the Virginian railroad at Norfolk, Va., is to be placed in another district. Locally, new inquiry involves 500 tons for the National Screw & Tack Co. Action is expected in a day or two on 400 tons for a parcel post building for this city. Prices remain unchanged.

Smaller Volume Booked

Philadelphia, Nov. 21.—The structural shape business is steady but the volume is considerably less than a few weeks ago. Eastern mills are unable to get sufficient business to maintain full operations. The price of most business is 2.10c Pittsburgh, with 2.00c applying on attractive work.

CONTRACTS PLACED

Awards reported this week ..... 10,912 tons
Awards reported last week..... 16,558 tons
Awards reported two weeks ago... 17,409 tons

2200 tons, power plant at Terre Haute, Ind., previously reported as placed with independent through Stone & Webster, went to McClintic-Marshall Co.
1685 tons, tower for Illinois power station of Middle West Power Co., to unidentified fabricator.
1500 tons, Collinwood high school, Cleveland, to King Bridge Co.
1200 tons, plant for Michigan Steel Corp., Detroit, to unidentified fabricator.
1000 tons, Tifereth Israel temple, Cleveland, to Republic Structural Iron Works.
700 tons, Olden avenue viaduct, Trenton, N. J., awarded to unnamed fabricator.
700 tons, foundry for Bartlett-Hayward Co., Baltimore, to American Bridge Co.
625 tons, factory building for Chevrolet Motor Co., Buffalo, to Kellogg Structural Steel Co.
540 tons, extension to Kansas City Southern railroad shops, Pittsburg, Kans., to Kansas City Structural Steel Co.
365 tons, Western States Life Insurance building, San Francisco, to Dyer Bros. Structural Steel Co.
325 tons, for ice plant in 161st street, New York, awarded to independent shop.
300 tons, Henkelman garage, Atlantic City, to Belmont Iron Works.
295 tons, Missouri Portland Cement Co., Prospect Hill, Mo., to Mississippi Valley Structural Steel Co.
252 tons, Oak Park Trust & Savings Bank building, Oak Park, Ill., to unidentified fabricator.
225 tons, waterworks standpipe, Norwood, O., to Stacey Mfg. Co.
201 tons, Missouri Pacific railroad, machine shop addition, St. Louis, to Mississippi Valley Structural Steel Co.
200 tons, power plant Vischers Ferry, N. Y., to Bethlehem Steel Bridge Corp.
185 tons, Third Church of Christ Scientist, Milwaukee, to Lakeside Bridge & Steel Co.
150 tons, grandstand for athletic field, Nash Motors Co., Kenosha, Wis., to Worden-Allen Co.
140 tons, Johns-Manville, Inc., Waukegan, Ill., to American Bridge Co.
118 tons, material for strengthening bridges, St. Louis & San Francisco railroad, to American Bridge Co.
106 tons, Glen Lake sanatorium, Oak Terrace, Minn., to Crown Iron Works.
100 tons, mill addition for Milwaukee Rolling Mill Co., West Allis, Wis., to Worden-Allen Co.
Several hundred tons, six bridges for Buffalo Creek & Gauley railroad, to Phoenix Bridge Co.

CONTRACTS PENDING

10,000 tons, bridge at St. Charles, Mo., bids asked.
8000 tons, West side power station, Commonwealth Edison Co., Chicago, bids asked.
2000 tons, apartment, Sixty-third street and Park avenue, New York, for Dwight P. Robinson, Inc., bids asked.
1880 tons, apartment store for Rich Bros., Atlanta, Ga., bids asked.
1500 tons, annex to Rosslyn hotel, Los Angeles, bids being taken.
1100 tons, warehouse for Revillon Freres in West Thirtieth street, New York, inquiry revived.
1000 tons, apartment for Joint Ownership Construction Co., Sixty-ninth street and Park avenue, general contracts to Heggerman & Harris.
1000 tons, warehouse in Amsterdam avenue, New York, bids asked.
1000 tons, apartment, Sacramento and Mason streets, San Francisco, bids to be asked soon.
800 tons, Giano apartment, Fifty-fourth street and Seventh avenue, New York, bids asked, pending.
500 tons, addition to plant of National Screw & Tack Co., Cleveland, bids being taken.
500 tons, for bridge over the White river for the the Chesapeake & Ohio railroad, bids being taken.
400 tons, shed, Seventh street, New Orleans, for board of port commissioners, bids asked.
400 tons, French apartment, Fifty-fifth street and Park avenue, New York, bids asked, pending.
400 tons, parcel post building, Cleveland, general contracts to Sam W. Emerson Co.; steel about to be let.
380 tons, refrigerating plant for Santa Fe railroad, Bakersfield, Cal., general contract to Fellows Co.
350 tons, highway bridge, Boonville, Mo., advised bids being taken.
260 tons, grain elevator sacking plant, New Orleans, for board of port commissioners, bids asked.
100 tons, garage, Hudson and Charles streets, New York, bids asked, pending.

Heavy Bookings

In Some Wire Products Are Shown—Producers Turn Away Orders

WIRE PRICES, PAGE 1382

Pittsburgh, Nov. 21.—More or less heavy bookings of smooth wire as well as nails continue to feature the wire products market. On barbed wire and fencing, however, orders are not considered large. Contracts for spring fencing probably will commence to be booked next month. A considerable amount of wire business has been turned down by an eastern Pennsylvania producer. One lot in this class which with some wire rods amounted to 1500 tons, came up this week. A producer located in the Mahoning valley too, is refusing to accept smooth wire business since it is filled up to the end of the year and does not as yet care to commit itself as far ahead as January. Unless conditions improve measurably, however, some of these present bookings will be carried over. Jobbers are ordering nails of various sizes, and the

aggregate volume on the books of prominent producers soon will be equivalent to their possible output for the remainder of the year. The drain upon jobbers' stocks has been remarkably well sustained. Plain wire still is quoted at 2.45c and nails at 2.70c, base Pittsburgh, with the Cambria Steel Co. $1 per ton in advance of those levels.

Demand Is Heavy

Buffalo, Nov. 21.—Demand for all kinds of wire and specialties is heavy. Deliveries are lengthening into the first quarter. Even old customers' wants can not be entirely satisfied One of these on a 2000-ton order could only obtain 1000 tons.

Specifications Are Lighter

Chicago, Nov. 21.—Specifications for wire are lighter but whether this is a temporary recession or portends a gradual slackening in business such as generally obtains during the winter season cannot be ascertained. It is notable, however, that the leading producer has not been able to increase operations and that buyers generally have not accumulated any stocks. Business from the South is unusually good and the open weather has prolonged the demand for nails in certain sections of the West and North. Prices are unchanged.

Coucible Outlook Clears

The first two months of the current fiscal year of the Crucible Steel Co. of America have reflected very materially the improvement in conditions, according to a statement by Chairman Horace S. Wilkinson of the company. He said:

"The balance sheet is now showing a profit instead of a loss. The month of October shows the largest increase in orders over the previous month that we have had at any time since the depression began. We believe that the tide has turned and that in the near future we will be able to make a substantial profit. Operations at our Midland plant are assuming more normal conditions than at any time in two years. Unfilled orders are increasing each month. We look forward with great confidence for the future." All directors were re-elected at the company's annual meeting.

Foundry Damaged by Fire

Pittsburgh, Nov. 21.—The plant of the Duquesne Steel Foundry Co. at Kendall Station near Coraopolis was badly damaged by fire last night. The fire started in the pattern shop and spread to the pattern storage building, machine shops and the two foundry structures. The damage is said to be large.

Would Bar Undesirables

Washington, Nov. 21.—Chairman Johnson, of the house immigration committee, states the first work of his committee at this session will be to submit an amendment to the 3 per cent act, barring aliens who would be ineligible for citizenship. The committee's program probably will be developed late this week.

Small Car Inquiries Active

New Requirements Come from Miscellaneous Sources and Individually Are for Few Units—Buying Light—Locomotive Inquiry Heavy

RAILROAD TRACK MATERIAL PRICES, PAGE 1382

Chicago, Nov. 21.—Local mills still have definite protections out on 38,500 cars and there still appears to be a probability that the New York Central and the Pennsylvania will enter the market for 30,000 cars each. The Chicago, Milwaukee & St. Paul has placed tentative orders for 2000 box and 3000 gondola cars with western builders and is now awaiting the authorization of the purchase by the board of directors. Demand for track supplies is somewhat more active although confined to rather small lots. Prices are unchanged.

Bids On Accessories

Cleveland, Nov. 21.—Manufacturers of car accessories are figuring on an inquiry from the Baltimore & Ohio railroad for 2000 box cars. It is reported this inquiry may be increased later to 5000 cars.

New Inquiry Is Active

New York, Nov. 21.—Car awards are relatively light, although inquiry is fairly active. The outstanding list of the week in this district calls for 3000 to 5000 cars for the Baltimore & Ohio. Locomotive inquiry calls for 30 for the Lehigh Valley, 60 for the Chicago, Burlington, & Quincy, five for the Georgia railroad, and one for the Delaware & Hudson. The Central of New Jersey has closed on five locomotives to the Baldwin Locomotive Works. It is still inquiring for 10 switch engines, as recently reported.

Locomotive Inquiry Large

Philadelphia, Nov. 21.—The Baldwin Locomotive Works has booked 50 locomotives for the St. Paul railroad which is figuring on buying 50 more. The Burlington is figuring on 50 to 100, the Baltimore & Ohio 75, and Lehigh Valley 15. The light rail demand is good with prices 2.00c to 2.25c Pittsburgh, depending upon quantity and delivery.

Producers Comfortably Situated

Pittsburgh, Nov. 21.—Although the larger users of light rails have covered their requirements to the end of the year and producers like the Carnegie Steel Co. on that account are comfortably situated as to light rail business, small buying still is noted. While much business has been taken since September and October at 2.25c, base Pittsburgh, and specifications are being furnished, spot orders of single carloads now are taken at 2.00c to 2.15c. The latter is the usual price although the 2.00c figure is made in competition with the rerolling mills.

No particularly active buying of track accessories is under negotiation. A recent buyer was the New York Central and as the result of this and earlier buying the mills are well booked. The spread on standard spikes has narrowed to 2.75c to 2.85c, Pittsburgh. Because of the more limited output of small spikes, however, a wide range of quotations is maintained, 3.50c to 3.75c. Track bolts still are quoted at 3.85c to 4.50c with small inquiries and orders noted from time to time while the tie plate demand at 2.35c to 2.50c is practically negligible.

CAR ORDERS PLACED

Union Pacific, 100 tank cars, to American Car & Foundry Co.
East Jersey Railroad & Terminal Co., 36 tank cars, to American Car & Foundry Co.
Central Railroad of New Jersey, which recently placed 35 coaches with American Car & Foundry Co. and 30 with Standard Steel Car Co. has placed 25 additional coaches with each company.
Elgin, Joliet & Eastern, repairs on 500 gondolas, to James G. Heggie & Sons.
El Paso & Southwestern, four passenger, to Pullman Co.
Rock Island, 50 suburban coaches, to Standard Steel Car Co.
National Plate Glass Co., 10 gondolas, to Pressed Steel Car Co.

CAR ORDERS PENDING

Baltimore & Ohio, 2000 hoppers, 2000 box, and 1000 gondolas, pending; may buy 3000 more box.
Central Railroad of Brazil, 200 box, 200 gondolas, and 75 miscellaneous coaches, pending.
Ulen Contracting Co., 120 Broadway, New York, 35 flats, pending.
Great Southern Refining Co., Lexington, Ky., 80 tank cars, pending.
National Railways of Mexico, 10 mail cars, pending.
Madiera Hill Coal Co., 25 mine cars, pending.
Cranberry Creek Coal Co., 150 mine cars, pending.
Pennsylvania Coal Co., 175 mine cars, bids asked.
Berwind White Coal Co., 200 to 400 mine cars, pending.
Pittsburgh, Shawmut & Northern, 200 stock cars, pending.
Pittsburgh railways, 100 street cars, pending.
Akron, Canton & Youngstown, 150 hoppers, pending.
Hartland Colliery Co., 500 hoppers, pending.
W. H. Warner Co., 50 hoppers, pending.
National Tube Co., 10 coke cars, pending.
Aluminum Co. of America, Pittsburgh, 50 hoppers, pending.
Conley Tank Car Co., 100 to 500 hoppers.
Chicago, Milwaukee & St. Paul, 3000 gondolas and 2000 box reported placed with western builders, pending authorization of directors.
Pere Marquette, 1500 box and 500 hoppers, expected to be let this week.
Northern Pacific, 3000 box, expected to be let this week.
Spokane & International, 50 flat, bids asked.
Monon, repairs on 500 gondolas, bids asked.
Detroit, Toledo & Ironton, repairs on 500 gondolas, bids asked.
Ford Motor Co., steel underframes for 500 40-ton box, bids asked.
Pennsylvania Tank Car Co., 300 tank, bids asked.
United States Fuel Co., 300 narrow gage mine cars, bids asked.
Atlanta & West Point, 150 hoppers and two baggage, bids asked.
Brooklyn Rapid Transit, 50 passenger bodies and 100 passenger car trucks, bids asked.
Long Island, 40 motor cars, 20 trailers, 10 steam passenger and two combination baggage and mail, bids asked.
Ash'and Coal & Iron Co., 50 hoppers, bids asked.
Dry Branch Coal Co., 20 hoppers, bids asked.
New York Consolidated, 50 passenger bodies and 1100 trucks, bids asked.

Freight Loadings Slump

Washington, Nov. 14.—Freight loading in the week ended Nov. 4 was 994,827 cars, a decrease of 20,000 cars from the preceding week, but is the highest on record for the first week in any November. Coke loadings were increased somewhat in the week but coal and ore loadings fell off.

It is estimated that steel casting plants in the eastern section of the country are operating on an average of about 60 per cent of capacity.

Building Bar Orders Small

Awards Confined to Jobs of Lesser Importance During Week—Some Sizable Lots Pending—Seasonal Slump Is Indicated

REINFORCING BAR PRICES, PAGE 1382

Chicago, Nov. 21.—With so large a tonnage of bars on inquiry for reinforced concrete projects, sales are holding up at a rate seldom met this late in the season. While the total business involved in projects taking more than 100 tons is unusually large, a greater total is reached by sales of lots less than 100 tons, making the business now being booked far heavier than usual toward the end of the year. Prices seem somewhat stronger, although some low figures are still obtainable. It appears that the market is fairly steady at 2.25c, Chicago store, with occasional lots commanding up to $2 per ton above this figure. At the same time, occasional sales are made on which a price close to 2.00c Chicago mill, is made. With the heavy sales now being booked, some sellers are stiffening their position somewhat and the market indicates a stronger footing.

Intermittent Awards Noted

Pittsburgh, Nov. 21.—Concrete bar fabricators continue to book small jobs. The larger work appears to be held back as is usually the case in the fall and winter. On this account, the industry largely is marking time. Prices have not weakened greatly, although one interest in the Youngstown district now is quoting 1.95c, base Pittsburgh. Others are quoting 2.00c and up to 2.15c, and the 1.95c price may be only temporary while the steel company is making a drive to deplete its warehouse stocks. Bids on the 225 to 240 tons required for the Fortieth street bridge, Pittsburgh, closed last Monday, are being tabulated. Except for two awards of 170 and 120 tons, respectively, other lettings are deferred and so far as industrial building is concerned, the seasonal lull apparently has started.

Report Two Jobs Placed

Cleveland, Nov. 21.—Reinforcing bar contracts reported placed here this week involves 570 tons, including 120 for library foundation, Cleveland, and 450 for a sewage disposal plant at Marion, O. Some sizable work is pending. Prices remain around 2.80c mill.

CONTRACTS PLACED

Awards reported this week.....	3,445 tons
Awards reported last week.....	4,175 tons
Awards reported two weeks ago....	7,141 tons

450 tons, sewage disposal plant, Marion, O., to Pollak Steel Co.

450 tons, California hotel, Fresno, Cal., to Edward L. Soule Co.

400 tons, hotel for Poppenfuss & La Rue, Chicago, to Barton Spiderweb System.

400 tons, warehouse for Westinghouse Electric & Mfg. Co., Chicago, to Kalman Steel Co.

200 tons, Hayes hotel, Chicago, to Truscon Steel Co.

200 tons, Northern State Normal school, Marquette, Mich., to Kalman Steel Co.

200 tons, bridge at Lansing, Mich., to Kalman Steel Co.

200 tons, warehouse in Bay street, San Francisco, to Simmons Co.

170 tons, South high school building, Pittsburgh, to Concrete Steel Co.

125 tons, apartment building at Fort Dodge, Iowa, to Truscon Steel Co.

120 tons, foundation, public library, Cleveland, to Bourne-Fuller Co.

120 tons, building for Studebaker Sales Co., awarded Concrete Steel Co.

110 tons, bridge at Hazleton, Ind., to Concrete Steel Co.

100 tons, building for Overton Hygiene Co., to Kalman Steel Co.

100 tons, building for Danville Electric Co., Danville, Ill., to Concrete Steel Co.

CONTRACTS PENDING

1000 tons for sewage disposal plant at Indianapolis, general contract to L. W. Hancock Co., Louisville, Ky.

800 tons, terminal warehouse, Los Angeles, general contract to Wurster Construction Co.

500 tons, government hospital at Camp Sherman, O., general contract to George A. Fuller Co.

400 tons, for warehouse at Cleveland, for International Harvester Co., bids asked.

300 tons, high school building at Evanston, Ill., bids opened Dec. 7.

225 to 240 tons, Fortieth street bridge, Pittsburgh; bids being tabulated.

100 tons, grade crossing elimination, Pennsylvania railroad, Cleveland, bids in.

Tonnage not stated, public school at Wichita Falls, Tex., bids asked.

Tonnage not stated, for United States Veterans' hospital, Knoxville, Iowa, 14 buildings, bids asked.

Ferro Inquiries

Appear for First Quarter—Sales Total Small—Some English Spiegel Sold

FERROALLOY PRICES, PAGE 1382

New York, Nov. 21.—Current inquiries for ferromanganese call for several thousand tons for shipment beginning immediately and extending in some cases through the first quarter. Sales of the past week probably did not exceed over 500 tons. This business involved mostly English metal, at $67.50, c.i.f. tidewater. At the same time some English metal was sold at $100, duty paid, tidewater. This figures out to 69 cents less than the $67.50 c.i.f. price for 79 per cent metal.

A little English spiegeleisen was sold last week at $36.50, duty paid, tidewater for quick shipment. Domestic spiegeleisen is quoted at $36 to $37, furnace, for 20 per cent. It is expected some sizable business will be closed this week.

Producers of 50 per cent ferrosilicon and of ferrochrome are fully occupied making deliveries against specifications on old contracts and supplies available for new business for this year's shipment are limited. Prices have been strong. Sales of 50 per cent ferrosilicon, involving about 400 tons, for December shipment, are reported at $80, makers' works and the price range for December shipment is firm at $80 to $85, delivered. No Canadian 50 per cent ferrosilicon has been offered since the new tariff became effective. A large manufacturer of ferrochrome has advanced its price on the 4 to 6 per cent carbon to 13 cents, while another maker continues to quote 14 cents a pound contained. The price range on domestic material is 13 to 14 cents while foreign 4 to 6 carbon ferrochrome still can be purchased at 12 cents a pound contained.

A sale of standard ferrotungsten is reported at 94 cents a pound contained, the lot involved being 10,000 pounds of contained tungsten. Another sale of several thousand pounds also was made recently at 95 cents. The market range for ferrotungsten now is 93 to 95 cents. Powder is held firmly at $1 a pound. Concentrates are held at $7.50 to $7.75, with buyers at $7.25.

Ferrovanadium is unchanged at $3.50 to $4 a pound contained, with good steady business. Ferromolybdenum has been featureless, at $1.85 to $2 a pound contained, for standard alloy.

Sales Total 4000 Tons

Philadelphia, Nov. 21.—The ferromanganese demand is increasing. Total sales in the past few days is about 4000 tons of which 3500 was domestic and the rest English. Half of this tonnage is prompt and the remainder first quarter. Considerable further inquiry is pending. The market is $100 furnace, domestic, and $100 duty paid, tide water, for English.

Inquiry Interest Increases

Pittsburgh, Nov. 21.—Possibly the several alloy inquiries now current foretell an awakening in connection with ferroalloys since this past week has seen more life in the ferromanganese market at least than has been apparent for some time. Several carload and 100-ton lots have been closed at $100, furnace, and sellers report knowledge of one or two arrangements having been consummated for first quarter requirements. Some additional foreign material, too, has been disposed of and importers have several quotations out on fair sized tonnages. Either the intimation from sellers of English material that the price soon would be advanced from $67.50 to $100 or even $150 c.i.f. Atlantic seaboard is bearing fruit, or else consumers find their stocks are fast dwindling under increased operating schedules. Importers point out that with the present duty on manganese ore, little margin is left for the American producer at $100, furnace and that domestic ferromanganese, too, soon must advance. A large crucible steel interest asks for prices on 600 tons of 80 per cent grade, 300 tons for prompt delivery. From $36 to $37, furnace, is being quoted on 16 to 19 and on 19 to 21 per cent spiegeleisen.

Among three or four inquiries issued lately for ferrovanadium for small lots, one comes from the Andrews Steel Co. for prices on 2000, 5000, 10 000 or 15,000 pounds. A price of $3.50 is quoted. One or two inquiries likewise are out for ferrotungsten. Prices around 95 cents still are quoted. No inquiries at all are reported here for ferrochrome although occasional small sales are made.

Pipe Mills

Heavily Committed—Bids to Be Asked Soon on 20,000 Tons of Cast

PIPE PRICES, PAGE 1382 AND 1446

Pittsburgh, Nov. 21.—Standard full weight merchant pipe in some sizes cannot be had from independent mills inside of 12 to 16 weeks. Deliveries

of other sizes are from 6 to 8 or 10 weeks deferred. This means that in some cases the production of certain sizes of buttweld pipe for the first quarter of 1923 already is obligated although comparatively prompt deliveries can be had on the lapweld sizes, both black and galvanized. This accumulation is the result of widespread buying in relatively small lots and while the conditions at the National Tube Co. are less severe, it too is heavily committed as is shown by the fact that many of its customers have been approaching independents with offers of tonnage. On oil country goods, some business can still be taken for shipment before the first of the year although production for December largely is obligated. Card discounts are holding firmly on the basis of the October advance although the majority of present invoices carry the preceding discount. Putting down of line pipe largely will await next spring's activity although intermittent purchases doubtless will be made, particularly for destination in the South or Southwest. At present no large line pipe business is pending although there is more or less steady buying of 6000, 8000 or 10,000 feet at a time, mainly of 4, 6 or 8-inch sizes. Wrought iron pipe demand continues fair and operations are increasing slightly.

To Figure 20,000 Tons

New York, Nov. 21.—Bids will be asked shortly on 20,000 tons of 24 and 30-inch cast iron pipe for the city of San Juan, Porto Rico. This is by far the largest job in prospect for the near future. Trading at present is comprised chiefly of private demand, which is well above normal for this season of the year. Despite the weakness in pig iron, prices continue firm.

Only One Award

Chicago, Nov. 21.—The United States Cast Iron Pipe & Foundry Co. has been awarded 500 tons of pipe for a new sewage disposal plant at Indianapolis. This is the only pipe letting of the week and no business is in sight. In view of the infrequency of sales it is difficult to ascertain ruling prices. All pipe shops are comfortably booked and are not pressing for new business.

Some Business Still Up

Birmingham, Ala., Nov. 20.—Enough business still is coming in to warrant steady operation of the plants producing cast iron pipe. Indications point to activity all through the winter. Orders on hand are of good volume. Car service is still under what it should be. Attractive orders are said to be bringing about some concessions on the $43 price but this is limited. Anticipations are that during the coming month bids will be asked on a large tonnage and specifications will follow in a short while, delivery to be given early in next year. Confidence is expressed that 1923 will be as good as the present year. The United States Cast Iron Pipe & Foundry Co. has started the manufacture of pipe under De Lavaud method at its North Birmingham plant. The National Cast Iron Pipe Co. is preparing to install the new system at its plant at Tarrant City, Ala.

The Nonferrous Metals

Moderate Business Sufficient To Make Prices Strong, as Producers Are Well Booked—Aluminum Up

	Copper Electro delivered	Copper Lake delivered	Spot Straits New York	†Lead New York basis	Zinc St. Louis basis	Spot† aluminum	Spot antimony	Nickel spot
Nov. 15.....	13.87½	14.00	37.00	7.25	7.35	21.25	6.55	32.00
Nov. 16.....	13.87½	14.00	36.50	7.25	7.32½	21.25	6.50	32.00
Nov. 17.....	13.87½	14.00	36.37½	7.25	7.27½	21.25	6.50	32.00
Nov. 20.....	13.87½	14.00	36.62½	7.25	7.25	21.25	6.50	32.00
Nov. 21.....	13.87½	14.00	36.62½	7.25	7.20	21.25	6.50	32.00

†Outside market quotation.

NEW YORK, Nov. 21.—Inasmuch as producers of copper, lead and zinc are well sold up for this year's shipments, strong markets have prevailed on moderate sales of these metals, during most of the week. Tin prices have shown an easier tendency, due to the fact that Straits shipments the first half of November amounting to 4500 tons were fully as large as the entire month's shipments had been predicted. Aluminum quotations moved higher as importers adjusted their policies into line with the Nov. 1 advance by the domestic producer, and then the latter announced a further advance of 2 cents effective Nov. 22. Antimony declined 10 points.

A few important changes were reported in metal products prices. The minimum mill price for sheet zinc has been advanced to 9.25c, f.o.b mill and the discount list which stood for many years in the rolled zinc trade has been revised. The base price for weatherproof wire has been advanced ½c to 17.50c, mill. Some of the independent wire mills have advanced their base prices for bare wire to 16c, but the leading interest has maintained 15.75c, mill.

Most of the copper selling agencies have returned to the 14c delivered price for electrolytic copper for deliveries through the first quarter. Actual business has been done in good volume with domestic consumers at 13.87½c, delivered, but sellers at this price have become scarce. The heavy shipments in October, estimated at over 90,000 tons, and the recent improvement in the export sales to Germany and France have stiffened the market. Export sales were made the past week at 14.12½c, c.i.f. foreign port.

Foundry buying of copper has been good. Some of the principal casting copper refiners are booked through to the end of the year and are asking 13.50c, f.o.b. refinery.

Zinc sales for export were light this week, but total sales the past three weeks for shipment to Great Britain, France and Germany aggregated over 15,000 tons. Domestic demand has been rather light. Prime western sold up to 7.40c, East St. Louis, for prompt shipment, recently, but subsequently reacted to 7.20c on profit taking resales by dealers. High grade was quoted 8.25c, delivered.

The principal lead producers are practically sold up to Jan. 1, and current published prices are nominal. Pig lead for shipment this year is quoted 7.25c, New York, 6.90c to 6.95c, East St. Louis, in the outside market, as against 7c and 6.80c, respectively, quoted by the leading interest.

Straits tin prices reacted from the high level of 38c reached the previous week, to 36.50c this week, although a fair business was done in America on the decline. British speculative enthusiasm had pushed the foreign market up and has kept it partially up in the face of lack of information to justify the rise. There has been a slight improvement statistically since the first of January, but not enough to cause any alarm as to tin supplies in the near future. Ninety-nine per cent tin has been quoted ¾ to 1 cent below Straits.

A good business was done in foreign virgin ingot aluminum for importations and delivery the first half of 1923, early in November.

Mill Products

(Base prices cents per pound, f.o.b. mill)

SHEETS	
Copper, hot rolled 24 oz., min	21.50
High brass	18.50
Zinc, ga. 9 to 18 (plates ½c less)	9.25 to 9.50
Lead, full sheets (cut, ¼c more)	10.25
Aluminum, base 18 ga. and up	36.40
SEAMLESS TUBES	
High brass	23.00
Copper	24.75
RODS	
High brass, round, ¼ to 2½ inch	17.00
Naval brass rod	19.00 to 19.50
WIRE	
Copper	15.50 to 16.00
High brass	19.00

Old Metals

(Dealers' Buying Prices)

HEAVY RED BRASS	
Cleveland	$9.00 to 9.50
New York	8.50
Chicago	9.50
HEAVY YELLOW BRASS	
New York	6.25 to 6.50
Chicago	7.50
Cleveland	6.00 to 6.50
ZINC	
New York	4.00 to 4.25
Cleveland	4.00 to 4.50
HEAVY COPPER AND WIRE	
Cleveland	11.25 to 11.75
New York	11.00 to 11.50
Chicago	11.75
RED BRASS TURNINGS	
New York	7.75 to 8.25
Cleveland	8.00 to 8.00
Chicago	8.50
YELLOW BRASS TUBING	
Cleveland	6.00 to 6.50
NO. 1 BRASS ROD TURNINGS	
Cleveland	6.00 to 6.50
New York	6.75 to 7.00
Chicago	7.50
ALUMINUM BORINGS	
Cleveland	7.00 to 9.00

Operations Gain

In Pittsburgh Despite Railroad Hindrances—Adding to Active Stacks

Pittsburgh, Nov. 21.—The transportation situation still is the governing factor in steel mill operation here. The car supply is slightly better this week and the Pennsylvania railroad yesterday lifted its embargo for three days which will relieve a little, the congestion at finishing mills.

In addition to the Clinton furnace of the Clinton Iron & Steel Co., Pittsburgh, going into blast Nov. 15 the Claire Furnace Co.'s stack is being warmed up preparatory to producing iron Nov. 23. The Scottdale furnace of the McKinney Steel Co., likewise is going in and the Midvale Steel & Ordnance Co., will add three as soon as possible, eight stacks now being active at Johnstown, Pa. The last remaining idle furnace of the Jones & Laughlin Steel Co., No. 2 Eliza, was blown in last week, bringing blast furnace operations to 100 per cent for the first time in over two years.

Steel ingot-making is on the basis of 75 or 80 per cent; pipe mills are being operated at 80 per cent; sheet and tin mills of the American Sheet & Tin Plate Co., at 74 per cent; independent sheet mills 78 per cent; independent tin plate mills at 85 per cent; strip mills at 75 to 80 per cent; wire mills 70 to 80 per cent; and cold-drawn bar mills at 70 per cent.

The Valley Mould & Iron Co. plans to increase its output from 50 to 100 per cent by the last week of this month. The Farrell, Pa., plant of the American Steel & Wire Co., will be operating practically to capacity, with the starting up of the rod mill this week The National Tube Co., is starting up at Benwood, W. Va., after being idle since March, 1918. Eventually, perhaps before Christmas, the plant will be running full including two furnaces.

Valley Operations Are Being Maintained

Youngstown, O., Nov. 21.—Independent steelworks' operation throughout the Mahoning valley remains unchanged. Open hearth schedules are being maintained on an 86 per cent basis, representing 44 of the 51 units. The Republic Iron & Steel Co. has 12 open hearths active, the Brier Hill Steel Co. and the Youngstown Sheet & Tube Co. 10 each, the Trumbull Steel Co. seven and the Sharon Steel Hoop Co. five.

Sheet mill operation continues restricted due to mechanical trouble, lack of business and sufficient closed carriers. Eighty-eight per cent of the 111 sheet mills in the valley are active including 28 Brier Hill Steel Co.; 15 each at the Trumbull Steel Co. and the Youngstown Sheet & Tube Co.; 16 at the Newton Steel Co.; eight each at the Falcon Steel Co., the Mahoning Valley Steel Co. and the Republic Iron & Steel Co.; and six at the Sharon Steel Hoop Co.

Stacks in blast in the Mahoning valley total 21 representing 75 per cent of capacity. No. 1 stack of the Ohio Works of the Carnegie Steel Co. will be put in blast shortly. Of the 47 active furnaces in the Youngstown district 20 are in the Mahoning valley and 11 the Shenango. Miscellaneous works' schedules include nine pipe mills, and the bessemer rod and wire departments at the Youngstown Sheet & Tube Co.; six finishing and six pipe mills and the bessemer department at the republic Iron & Steel Co.; 16 hot tin mills and the strip departments at the Trumbull Steel Co.; and both plate mills at the Brier Hill Steel Co.

Chicago Operations Gain

Chicago, Nov. 21.—The Inland Steel Co. has increased its steel output to 75 per cent of capacity. The operations of the Illinois Steel Co., which registered a gain a week ago, are unchanged, 18 out of 27 steel works stacks being active and steel production on a 79 per cent basis. Although local steel production now ranges between 75 and 80 per cent, mills have not yet been able to accumulate winter fuel reserves and a short period of severe weather would cripple operations materially.

Industry Is Favored by British Election

European Special Service

LONDON, Nov. 20.—With definite returns on the British election finally available, features of the utmost significance industrially are noted. The conservative majority of 85 means that there will be a stable government, fostering individual enterprise and commercial expansion at home and abroad, in addition to leanings toward protection. It is unlikely that the existing so-called emergency duties of 33 1/3 per cent against American automobiles, cameras, etc., will be removed; rather greater protection can be expected, coupled with strong efforts of British manufacturers to push for overseas business. The result of the election is considered generally favorable to business.

Big labor gains cast a cloud especially over industrial centers such as Glasgow, Newcastle and Wales. Labor secured 141 seats compared with 76 it held previously, and is now the second party. The total labor poll was 4,100,000 compared to 2,100,000 in 1918. Several red laborites were elected. The whole forecasts a direct fight between conservatives and radicals, in which industry will have the deepest concern.

More Industries Increase Pay Than Personnel

Washington, Nov. 21.—Twenty-nine of the 43 representative industries surveyed by the bureau of labor statistics, department of labor, reported an increase in the number of employes in October as compared with September while 34 of the 43 had larger payrolls in October than in September. The iron and steel industries shared in both increases.

One hundred and forty iron and steel plants reporting for both months were employing 176,387 persons in October compared with 168,670 in September. The payrolls for a half month period aggregated $9,903,466 in October and $9,019,313 in September. The increase in personnel was 4.6 per cent and the increase in payrolls 9.8 per cent.

The automobile industry reported it was employing 5.9 per cent fewer persons in October than in September but paying them 0.9 per cent more. The agricultural implement industry showed a personnel gain of 2.6 per cent in October and a payroll gain of 4.6 per cent. Foundries and machine shops in October were employing 5.1 per cent more persons in October than in September and paying them 7.3 per cent more.

In the iron and steel industry the per capita increase in earnings in October was 5 per cent, but this was half the leading increase, which was 13.3 per cent, in the flour milling industry. The per capita advance in earnings in foundries and machine shops in October was 2.1 per cent, and in car building and repairing 0.1 per cent.

Foreign Spiegel Bought

Chicago, Nov. 21.—A local melter has purchased 1000 tons of foreign spiegel, 27 to 28 per cent, for delivery over the next four months at $47 delivered. Material, 18 to 22 per cent, is freely quoted at $44.05 delivered for large tonnages and $46.05 for carloads.

Western Prices Go Lower

Movement of Iron and Steel Products in San Francisco Market Shows Slight Decrease—Building Activity Continues

SAN FRANCISCO, Nov. 15.—Movement of iron and steel products has eased off during the past week and a tendency towards lower prices is noted in some lines. Wire products and pipe are still in heavy demand and some fair sized plate and shape inquiries are before the trade. Building activity throughout the West is keeping up well. During October, 36 cities including Los Angeles, reported a total of $19,350,071 in building permits as compared with $17,315,177 for the corresponding month in 1921. Up to and including Nov. 6, 1030 permits had been issued with a valuation of $2,295,079, as compared with $2,585,683 for the same period in October.

Pig Iron and Coke

Little of interest has transpired in the pig iron market during the past week. The interest in the southern part of the state who last week had an inquiry out for 500 tons of iron running 1.25 to 1.75 in silicon has not closed. This is the only large lot before the trade at the moment. On foreign iron in round tonnages equivalent to No. 2 southern, $28 c.i.f. San Francisco duty paid appears to be the low quotation. The Uniqn Tool Co. is in the market for 500 tons of forging billets.

Bars, Plates and Shapes

Bar mill operators in this district report a decrease in bookings for merchant steel bars and attribute it to the approach of inventory time. Six out of 12 open-hearths remain in operation this week. A fair volume of reinforcing bars, composed, for the most part of small lots of from 20 to 50 tons, continue to come out and there are several fair inquiries pending.

Mill representatives report demand for plates in small tonnages good. The largest inquiry this week involves about 3000 tons of tank work for one of the oil companies. No action has yet been taken on the tanks for the new refinery for the Shell Oil Co., Wilmington, involving 3600 tons, although it is thought the contract will be closed this week. The minimum price noted here is 2.40c c.i.f. San Francisco.

While few large awards of structural material were made during the past week a number of projects involving from 100 to 1500 tons are before the fabricators for figures. Prices remain unchanged with the minimum at 2.40c c. i. f. San Francisco.

Other Finished Material

Several independent sheet mills, who until recently were holding firm at 4.50c, base Pittsburgh on galvanized sheets are now meeting the level maintained by the Steel corporation. While some small lots are being placed, no large tonnages are coming out and it is the general opinion that little business in sheets will be done until the leading interest announces its first quarter prices. It is thought that 3.50c and 4.50c for black and galvanized sheets respectively may be the minimum for first quarter .

Pipe men report that oil country tonnage during the past week was of less proportions, though there is apparently no let up in demand for standard pipe. Stocks are very badly broken and low, much difficulty is being experienced in obtaining deliveries from the mills and demand is exceptionally heavy. Oil field operations reported to the State Gas & Oil Supervisor for the week ending Nov. 11 show 28 new wells started as compared with 40 during the previous week. The total new wells this year is 1230 as compared with 1138 the same date last year. Deepening or redrilling jobs numbered 17, as compared with eight the preceding week. Total to date this year 686; total same date last year 592.

An improvement is noted in demand coming in from municipal sources for cast iron pipe, although private demand is still dull. No action has yet been taken on the 3300 tons of 4 and 6-inch pipe for Los Angeles. Santa Ana will open bids on Nov. 27 for 237 tons of 42-inch class B. Los Angeles is asking for 2560 tons of eight and 24-inch class B. Bids open on Nov. 24. El Centro will shortly take bids on 213 tons of 4 to 10-inch.

Several canning interests engaged in the Alaska salmon packing industry are endeavoring to get tin plate mills to accept business for shipment at mill convenience at the base price of $4.75. It is doubted in many quarters whether these interests will be successful as many of the mills are booked for the balance of this year. Inquiries this week total over 70,000 base boxes.

Scrap Market

Active in Northwest—Iron and Steel Business Continues Brisk

Seattle, Nov. 15.—Business in iron and steel continues with unusual volume for the season. Jobbers report that while there is a slight easing off the turnover is exceptionally heavy. Logging and lumbering are active and the prosperity reflected by these industries is felt in foundries, machine shops and the wholesale trade. As a whole the market is firm, jobbers reporting continued difficulty in getting prompt deliveries from mills. Car shortage is still having its effect upon general business but it is expected to be relieved shortly.

Pig Iron and Coke

Under present conditions Eastern and Southern pig iron cannot compete in this market notwithstanding recent reductions. Only foreign pig iron is being sold, prices being firm and the demand fairly active. The best grades are quoted at as high as $34. A representative of a Belgian manufacturer offered what is said to be a good grade of iron at $27 c.i.f. The market is fairly well supplied with iron.

The last shipment of English coke has arrived and as far as known no additional orders have been placed. Fernie coke is again catering to the trade, preference being shown for the Canadian variety. Consumers complain that some foreign coke has arrived in unsatisfactory condition after being handled by steamer.

Bars, Plates and Shapes

While there are no large tonnages of bars being sold, the demand for small lots continues. Orders are for 100 tons or less. The steel mill is operating two mills two turns or from 60 to 75 per cent of capacity. Notwithstanding the lateness of the season the demand for both reinforcing and merchant bars is holding up. Recently the steel mill has taken contracts for a number of small orders from Portland and cities throughout Washington. Prices of bars remain firm and unchanged. One interest has received a repeat order for 250 tons of reinforcing bars from China. Plates and shapes are also moving in satisfactory volume, jobbers reporting no difficulty in getting orders.

Other Finished Material

Corrugated sheets have recently been in unusual demand due to fall repair work. Building hardware is also showing an increase over last year. The demand for pipe is not as active as two months ago. Dealers have replenished their stocks of pipe so that the shortage is no longer acute. In other items jobbers have been purchasing heavily although deliveries are uncertain. Warehouse prices have not changed.

Old Material

This market is active, stocks remaining low and prices firm. No. 1 cast iron is quoted at around $22.50 while steel scrap is offered at from $13 to $14. Export inquiries for steel scrap have eased off but the local demand for all kinds of old material has increased and dealers are having difficulty in replenishing their supplies.

Fabricators are busy with trade active. Developments in the Alaska Peninsula are being closely followed while it is known that drilling will be resumed during the winter on the Olympic Peninsula.

Work on the Associated Oil terminals in Seattle has been started. The Pacific Coast Steel Co. is furnishing 125 tons of bars for this job. Two 55,000 barrel oil tanks are also under construction on this site.

Word from the national capital announces that $500,000 is now available for construction at the Puget Sound navy yard. This will include a 600-foot extension to one of the piers and other improvements which will double the present capacity of the berthing piers.

Government Rests in Basing Case

Federal Trade Commission Concludes Taking Testimony on Pittsburgh Plus Hearing—Steel Corporation Expected To Enter Defense Beginning in January—Judge Gary Reappears—Schwab Also a Witness

WASHINGTON, Nov. 21.—Counsel for the federal trade commission in its attack upon the United States Steel Corp. because of the basing of steel prices at Pittsburgh have indicated they will buttress their case to a great extent by the failure of Judge E. H. Gary, chairman of the corporation, and other witnesses to explain to the commission:

Why, if the basing point practice is not arbitrary but is sensitive to the law of supply and demand, did Chicago producers of steel charge the Pittsburgh base price plus the freight to Chicago when their plants were operating far below capacity in 1914 and 1921 and the supply admittedly was in excess of the demand?

Why, if rails are sold on a mill basis because the purchasing carrier takes delivery at the mill, cannot other forms of steel be sold on a mill basis if the purchaser will take mill delivery or the equivalent?

How can statements that the basing point practice is predicated upon supply and demand be squared with statements, particularly by Judge Gary in reference to the Steel corporation's works at Gary, Ind., and Duluth, that Pittsburgh base is utilized to protect these localities?

Taking of testimony has been concluded by the commission and the case will rest until late January, possibly Jan. 22, when the Steel corporation will begin taking testimony at Chicago in defense of the charge that the sale of steel on a Pittsburgh basis is discriminatory and an unfair method of competition.

Seizing the opportunity to give in his own words an explanation of the basing point system, Judge Gary testified as follows when questioned:

Q.—The testimony of Mr. Andrews, who is the general manager of sales of the American Sheet & Tin Plate Co., showed that for the period of April to September the mills at Chicago were operating from 25 to 50 per cent of capacity, and that during all that year generally they were charging the Pittsburgh base plus the freight to destination on their steel. Would you say that was a result of the law of supply and demand?

A.—I do not remember the particular circumstances. If that was during the period when we were trying to steady prices generally by preventing them going down to a ruinous price, that may have been so. It may have been contrary to the law of supply and demand; but I would have to know the circumstances. I tried to explain the other day how we had held prices down for a number of months, notwithstanding the law of supply and demand would carry them much higher, because the demand was so great, and then how afterwards, when competitors went to the other extreme and put prices away below anything that was reasonable—very much below cost—and some of them as a part of their practices reduced wages very materially, then we tried to hold prices up and did hold our prices up as far as we could. This question of prices, in every line of business in the world, is one of the seller trying to get as much as he reasonably can, and sometimes reasonably, and sometimes unreasonably. Now, I have been free to admit to you that we have tried to act in such a way even at times disregarding the law of supply and demand, as to keep our prices on a fair and reasonable basis, whatever our competitors did. As everyone knows, I do not believe in charging extortionate prices even if you can get them and I do not believe in selling at ruinous prices if it can be prevented within the law and within reason. That might explain why sometimes I might have seemed to disregard the law of supply and demand. * * *

Supply and Demand Control

Sooner or later the law of supply and demand, as I understand it, controls, except where some corporation like our own will hold prices down notwithstanding the general demand is such that they could get very much higher prices. There comes in another question, the question of ethics.

I say, as a general proposition, that the law of supply and demand controls the question of prices sooner or later. If a new business starts out in a locality and becomes successful, and then the same line is started in another place—the first successful plant dominates the price. That is the quoting price. That is not confined to steel, that covers all the principal lines of business. Take steel, for instance. The first basing point as to iron I think was Philadelphia, but soon Pittsburgh became the principal operating point for the manufacture of both iron and steel, and then that became the quotation or base pricing point, and other plants starting in any other locality, when figuring for making prices for any purpose that they had in mind, which was desirable both to the purchaser and the seller, would base their quotations on the Pittsburgh point or base as it is commonly called. Now, a new plant could not compete with that locality, with their established plants and their fine organizations. Chicago could not do it. It needed some advantage in order to live, and the consumers in Chicago, of course, wanted to get products as cheaply as they could. That is always what they are figuring for, and they were very glad to have the steel business developed in Chicago, and by charging the Pittsburgh price with the freight added they were enabled to live.

In the course of time Chicago became more prosperous. Large plants were developed there and whoever filed the petition that the Pittsburgh base be eliminated, wanted their steel as cheap as people having plants in Pittsburgh got their steel, and they started this agitation. They claimed that steel could be made as cheaply in Chicago or Gary as it could be made in Pittsburgh, and with the existing first class plants in Chicago or Gary, particularly, that was true. That condition of the improved capacity and plant equipment in Gary brought about two things. First, it brought into Chicago additional plants like the Inland and the Interstate and a good many others of smaller capacity, some not quite so wide in diversity, and that competition was exactly what Chicago territory needed, because it not only gave them greater opportunity to buy but it also brought in the competition that reduced prices, and that is why this adding the freight from Pittsburgh to Chicago, to the Pittsburgh price, was more or less utilized to take care of that competition, so that a large part of the time the freight charge has been almost altogether eliminated.

Now, Chicago having been built up, of course, Duluth comes along, and by paying the Pittsburgh price plus the freight to Duluth their territory wants plants there, and we did establish a plant there, not very profitable, perhaps. I do not know whether it ever will be profitable or not, but there was an effort made to supply a part of the steel at least with plants that were operating there. The question of prices—the question of bases—always depends upon the circumstances. The Pittsburgh base operates more or less as protection to the locality and encourages plants to come in there and build new plants; and in addition to that, it furnishes a criterion for the consumer who buys the raw material, or the semifinished material and further finishes or converts it.

That is why I said in my remarks before the federal trade commission (referring to the conference in 1919 prior to the institution of the action) that there is involved in this whole investigation not only the purchasers and sellers who may be directly interested at a particular time but also other lines of business that are kindred and that also use the base, and, more than that, the different localities of the country. The man who files the petition in this case talks against discrimination, but the kind of discrimination he favors is one that gives him a benefit nobody else gets. He wants all the business he can get, and you let anyone start in the manufacture of steel, as some of them have during the last year or two, and he becomes immediately a convert to the Pittsburgh base, because sometimes he can get that and thereby get a little larger price for the commodities he sells, which he is willing to get; but his neighbor, for instance, the man at Springfield, has to pay for what he buys of the man in Chicago, who, in turn, buys the semifinished product and he pays not only on the Pittsburgh base as to the material which the Chicago manufacturer uses but also as to the material which the Chicago manufacturer buys, on whatever base he gets it, adding the Pittsburgh base, and a profit on that.

That is the way it works out even-

tually, because of these changes and the development of the country, the establishing of new places and the extensions and the competition which is inexorable, and always comes into a profitable place. The law of supply and demand will regulate these things and bring them down to a pretty fair equilibrium. That is the course of trade, and you cannot change the natural course of trade very long.

Of course, the Chicago man says he would like to compete with the Pittsburgh man in erecting structural steel somewhere near Pittsburgh or half way between the two, saying he thinks it is not fair that his competitor should buy semifinished steel in Pittsburgh at a lower price than he buys it in Chicago at some particular time, because the business then will justify charging Pittsburgh plus; but his market is the other way, largely in the West, and he makes his profits that way. If he thinks there

I concede as a witness that if there is any combination which is arbitrary and contrary to the Sherman law, the prices fixed by agreement are not only illegal but unconscionable and ought not be allowed; but at the same time I claim that this Pittsburgh basing proposition is not the result of any combination or any illegality, but grew up naturally, has been maintained naturally and has largely disappeared naturally because of competition. The law of supply and demand has brought this about, and when I speak of the law of supply and demand I do not mean the mere capacity to furnish but I mean capacity to furnish and willingness to furnish, the same as demand means not only a man with money in his pocket able to buy but a man willing to buy—and you cannot control that. I do not believe in a large corporation taking an unreasonable advantage of a customer to secure more than he should legitimately and naturally pay, even if the stress of circumstances might permit it sometimes.

Chicago will shortly become a basing point like Pittsburgh, if it is not already that, but Duluth will have a long wait, Judge Gary declared. When Judge Gary reiterated his belief that the law of supply and demand is made by buyer and seller, the following colloquy took place:

Q.—Don't you rather think you put too much of a soft pedal on the importance of comparative costs in your statement as to supply and demand?

A.—That comes back to the question of how much profit is the manufacturer entitled to. That is your question really, because the difference between price and cost is profit, isn't it? That is the way you get profit. Now, that would open up a very wide subject, how much profit is the manufacturer entitled to, how much is his risk, how much is his investment, and what is a fair percentage.

Q.—In free competition will he get a very big profit?

A.—If he did not get pretty good profits the manufacturer would go out of business, and then what would happen? I will just suppose that you could and should arbitrarily say that the United States Steel Corp. should not receive more than 5 per cent profit on its investment? What would happen? Why, a good many of the smaller producers who are in business profitably, and growing slowly, who are building up the country, who are adding to the competition and the supply and the convenience and all that sort of thing, would go out of business. Then instead of benefiting the great purchasing public you would be creating a monopoly. That is the tendency. The manufacturer runs a great deal of risk and you have to give him a fair return. Otherwise he will go out of business. Not only that, you have got to give him what he considers a fair return.

You undertake to control the selling prices of manufactured articles and the nrst thing you know you will drive a lot of them out of business, and all that works against the consumer, the great public that you are trying to protect. So if you could guarantee the right kind of a commission, I will not say that I would object to controlled prices, that is, to a maximum controlled price, speaking only for myself and not 1or my corporation; but the first trouble is to get an intelligent, impartial, disinterested commission that is not prejudiced and that would not in some cases do great injustice. That is more than we can expect at this time.

Use Base as Stabilizer

Judge Gary, continually emphasizing the importance of Pittsburgh base as a stabilizer of steel prices and opposing "ruinous, ruthless, destructive price cutting," went so far as to put himself on record as personally favoring controlled maximum prices were it humanly possible to obtain an impartial commission to act. The following exchange resulted between Judge Gary and Examiner John W. Bennett, who is hearing the case for the commission:

Q.—I want to ascertain when the Pittsburgh plus price will no longer be maintained in the Chicago region under the laws of supply and demand as you have defined them.

A.—When competition by the Chicago producers is such that everyone will nave to sell at the same price that Pittsburgh sells.

Q.—And when will the supply and demand of steel in this Chicago territory operate to bring about that condition?

A.—It takes something more than supply. It takes the question of profits. It takes the question of the prices people are willing to sell for. It depends upon the course of business, upon the great development of the western market, and all that sort of thing. Of course, the Pittsburghers have the same right to come into Chicago and build a mill that the Chicago people have to go to Pittsburgh and build a mill. There is nothing to prevent a manufacturer or a middleman going to Pittsburgh and taking advantage of the Pittsburgh price there, nor to prevent the eastern man or anybody else coming to Chicago.

Now, as to when this will happen I do not know, but this law of supply and demand, which is influenced by competition, will regulate it perhaps as to some things never; but as to steel I should say it will come in time. I think Chicago will be a base point at some time. It is pretty nearly that now in practice. I think it will be a long time before Duluth will become a base like Pittsburgh.

But as to markets I don't know. How long will Chicago be the wheat and pork market? How long will New Orleans be the cotton market or the sugar market that it is? How long will other markets continue? How long will St. Louis be the market for furs in the United States and Leipzig for the world?

To Judge Gary and to Charles M. Schwab, chairman of the Bethlehem Steel Corp., who was a witness Friday, counsel for the commission repeatedly put queries to draw out why steel other than rails is not sold on a mill basis. Judge Gary explained that rail prices are fixed by agreement between the producers and the railroads, that the railroads themselves take delivery and the matter of freight does not enter into the transaction. When asked why Duluth was not given a differential comparable to the $5 differential accorded the Birmingham steel producers Judge Gary said a Duluth differential had never been discussed. Were Duluth to be put on a mill basis and the price made identical with the Pittsburgh price the Duluth works of the Corporation "would very soon go out of business."

The examination of Mr. Schwab was much briefer than that of Judge Gary and Mr. Schwab, like the judge, was not cross-examined by counsel for the Steel corporation. Mr. Schwab pleaded ignorance of today's selling methods, stating that he is nominally chairman of Bethlehem but in reality is retired. Counsel for the commission read into the record, when identified by Mr. Schwab, excerpts from his testimony in the steel dissolution suit, especially that relating to the former pools.

Examination of W. H. Donner, president of the Donner Steel Co., Buffalo, was based less upon the relation of the Donner company to the case than to Mr. Donner's former connection with the National Tin Plate Co. at Anderson, Ind., and Monessen, Pa. Mr. Donner related how tin plate, in the early days of the industry, was priced upon the Swansea price plus freight to the consuming point and how gradually the Swansea base was swallowed up by the growth of the domestic industry and Pittsburgh base supplanted it.

James E. MacMurray, president of the Acme Steel Goods Co., Chicago, was called by the commission to refute certain points in the testimony of Judge Gary and Mr. Donner. Judge Gary had said Mr. MacMurray, who is president of the Western Association of Rolled Steel Consumers, the organization which initiated the basing point complaint before the commission, had grown rich despite the trade practice. Mr. MacMurray testified he is now using billets on which the freight is not charged. He said he is quoted mill prices by Chicago billet makers.

Americans Ask for British Scrap

Consumers on Pacific Coast Inquiring Abroad for Heavy Melting Material—United States Also Shows Renewed Interest in Foreign Hematite—New Advances Bring German Prices to World Levels

Iron Trade Review Staff Cable

European Headquarters,
IRON TRADE REVIEW,
23 Caxton House, Westminster, S. W.1

Sterling—$4.50

LONDON, Nov. 20.—Inquiries are being received in this market from San Francisco for heavy melting scrap. Inquiry from the United States also has been renewed for hematite iron, especially for West Coast material suitable as low phosphorus quality. Some furnaces are sold up to March.

British railways are buying considerable bridge steel. The market for finished and semifinished material is firmer and prices would be higher except for low continental offers. Belgium, for instance, has sold beams at £6 5s ($28.12), plates at £6 10s ($29.25) and nails at £7 (31.50), Antwerp. The firm of Cockrills in Belgium recently has taken an order from Poland which calls for building 100 locomotives.

Consumers in France have purchased 20,000 tons of British coke because of shortages in German reparation deliveries. The British sheet trade is heavy, and exports at present are triple those of 1921. Prices are firm. The manufacturers find Belgian competition very keen.

Further advances made in German prices have brought them to world levels.

Uncertainty Prevails in Market of Great Britain

European Staff Special

Office of IRON TRADE REVIEW,
Prince's Chambers, Corporation St.,

Sterling—$4.47

BIRMINGHAM, Eng., Nov. 14.—Hopeful and discouraging features are about equally balanced. In one direction there is news of revived buying by America, in some cases sufficient to keep furnaces employed until March. It has been found possible to restart the Dowlais Steelworks of South Wales. An additional furnace has been lighted in Barrow.

On the other hand is the restraining influence arising from severe continental competition, due to the slumped conditions of the exchanges. Today's Brussels exchange shows a franc value of 76 compared with 25 before the war. This represents an alarming financial condition, reflected on this side by drastic price cutting. Paris makes a bad second with 69 francs and France is coming along as a large furnisher of cheap steel.

In South Wales this week sheet bars are obtainable from Belgium at £5 12s ($25.03) as against the Welsh price of £7 ($31.29). Germany now has offered ship plates at £6 8s ($28.60) against the nominal Welsh price of £9 ($40.23). This drastic foreign competition is naturally restraining business. Its chief effect is felt at the steel centers on the seaboard. Many thousands of tons of steel billets have been dumped on Tees side from France and Belgium at prices about £6 ($26.82) per ton, and are being largely used for rolling into sheets, light bars, wire, etc. The buyer of this material, although very glad to effect a saving, finds that this sort of transaction is an anxious business in view of the fluctuating quotations and the liability to serious delay.

With every improvement in the foreign steel market, delivery is checked and prices are being revised almost daily. The ultimate influence tends in the direction of postponed business.

Increases have taken place this week in the prices of English semi-finished steel. Certain large firms have raised their quotations from £6 17s 6d ($30.73) to £7 2s 6d ($31.84). They explain that this merely reduces their losses, since the higher price carries no profit. A fair quantity of semi-finished steel has been bought lately from English and Welsh mills and at the moment there is no excess of this material on the market. Two large concerns specializing on semi-finished steel, namely the Ebbw Vale steelworks, South Wales and Alfred Hickman, Ltd., Staffordshire, both have their mills idle at present.

Cheap foreign steel has not yet invaded the tube trade. In another department that of nut and bolt manufacture, offers of cheap bars are abundant, No. 3 iron being quoted this week at £6 ($26.82) f.o.b. Antwerp equal to £7 10s ($33.52) delivered in Birmingham. The Staffordshire iron replaced by this material sells at £9 15s ($43.58). It is generally agreed that these continental offers exercise a potent influence in delaying new business.

A sign of the extreme stringency of finance is the failure this week of two small iron rolling companies in South Staffordshire.

The flow of new shipbuilding orders has been continued on the Clyde. They are mostly liners, however, and tramp steamers are not being ordered in anything like the required number. Barrow has secured an order for an Orient liner of 20,000 tons. Barrow expects now to go steadily forward, and there are now 14 furnaces in operation, the largest number for many months. A considerable volume of foreign trade will, however, be necessary if the comparatively large output in that area is to be absorbed.

On the Northeast Coast it is still found possible to sell good quantities of pig iron to America but the furnaces already operating are quite able to handle the business to be done.

The blast furnaces in all parts of the Kingdom are handicapped by expensive coke. In the Midlands coke selling at £1 3s ($5.14) makes any restarting of furnaces hopeless; indeed it is a question with several how long the furnaces at work can continue in operation. Orders for foundry and forge iron are still restricted to small quantities.

There are more signs of activity in the Tees district and mills are slightly more active, but as already suggested, cheap foreign steel is coming in in larger quantities.

The Rotherham works producing basic steel have found a decided revival in demand during the past week or two and trade generally at Sheffield is looking up, especially in the cutlery department. An encouraging feature is the increased demand for steel strips and wire rods, the latter enabling the modern rod mill of Steel, Peach & Tozer to make full time after a long period of idleness. The wire trade generally has shown some improvement which from its relation to other industries is regarded as a very good sign.

Birmingham is particularly encouraged by fairly substantial orders for railway rolling stock placed within the last week or two, some of the works concerned being now fairly filled up. So far this business has not reacted on the Staffordshire iron industry, in which trade is decidedly flat.

The galvanized sheet trade continues to show improvement with prices ranging between £17 ($75.99) and £17 10s ($78.22) with an upward tendency assisted by the high price of tin and spelter. All the recognized foreign customers have lately been placing orders, a lead being taken by South America, South Africa, India

Current Iron and Steel Prices of Europe

British Market

Home Market Prices. Gross Tons at Works or Furnace.

Corrected to Date by Cable

	$	£ s d
SEMIFINISHED STEEL		
Billets, soft steel	28.70	6 7 6
Sheet bars	28.70	6 7 6
Wire rods	40.50	9 0 0
FINISHED STEEL		
Steel bars, England, ⅜ to 3-inch	37.13	8 5 0
Steel bars, England, ⅜ to 3-inch, for export	34.88	7 15 0
Plates, ship, bridge and tank, England	38.25	8 10 0
Plates, ship, bridge and tank, England, for export	36.00	8 0 0
Plates, ship, bridge and tank, Scotland	37.13	8 5 0
Plates, ship, bridge and tank, Scotland, for export	34.32	7 17 6
Beams, England	37.13	8 5 0
Beams, England, for export	33.75	7 10 0
Beams, Scotland	36.00	8 0 0
Beams, Scotland, for export	33.75	7 10 0
Sheets, black, 24 gage	48.38	10 15 0
Sheets, galvanized, 24 gage	78.20	17 7 6
Rails, 60 lbs. and over	36.00	8 0 0
Rails, 60 lbs. and over, for export	32.63	7 5 0
Tin plate, base box, 108 lbs	4.44	0 19 9
Steel hoops	46.13	10 5 0
Steel hoops, for export	45.00	10 0 0
PIG IRON		
Hematite, East Coast, Mixed Numbers	21.05	4 13 6
Hematite, West Coast, Mixed Numbers	21.05	4 13 6
Basic Middlesbrough	18.00	4 0 0
No. 3 Foundry, Middlesbrough	20.82	4 12 6
No. 3 Foundry, Derby, Leicester, Nottingham	20.82	4 2 6
No. 3 Foundry, Northamptonshire	18.00	4 0 0
No. 3 Foundry, Staffordshire	18.00	4 0 0
No. 3 Foundry, Scotch	21.95	4 17 6
Ferromanganese, 76 to 80 per cent	67.50	15 0 0
Ferromanganese, 76 to 80 per cent, for export	64.13	14 5 0
COKE		
Yorkshire furnace	5.07	1 2 6
Yorkshire foundry	6.20	1 7 6

Where no separate export prices are given, same quotations apply to domestic and foreign business.

German Market

Prices Last Reported

	$	Marks per metric ton
PIG IRON		
Hematite, Oberhausen	12.21	73,662
Foundry, No. 3, Oberhausen	12.00	73,592
Bessemer Stahleisen, Siegen	13.58	83,326
Foundry, No. 1, Oberhausen	12.21	73,662
Luxemburg Foundry	11.10	68,730
COKE		
Ruhr furnace	1.94	11,873
Ruhr foundry	2.01	12,354
SEMIFINISHED STEEL		
Billets	18.01	110,480
Sheet bars	18.78	115,240
Wire rods	18.41	112,970
FINISHED STEEL		
Standard rails	15.00	92,000
Merchant bars	20.98	128,740
Structural shapes	20.76	127,410
Ship plates	23.02	141,220
Medium plates, 3 to 5 millimeters	26.76	164,180
Sheets, below 3 millimeters	27.67	169,840
Tin plate	60.51	371,200
Plain wire	22.68	139,110
Bands and strips	24.89	152,700

All prices are f.o.b. furnace or mill.

French Market

Prices Last Reported

	$	Francs per metric ton (2205 lbs.)
PIG IRON		
Hematite, Lorraine	22.25	300
Basic Bessemer, Lorraine	17.43	235
Foundry, Longwy, No. 3, sand-cast	16.68	225
Foundry, Longwy, No. 3, chill-cast	17.43	235
Ferromanganese, 76 to 80 per cent	70.07	945
COKE		
French furnace	6.82	92
German furnace, f.o.b. frontier	7.04	95
French foundry	9.19	124
SEMIFINISHED STEEL		
Blooms	24.10	325
Billets	26.32	355
Sheet bars	28.18	380
FINISHED STEEL		
Standard rails	40.78	550
Merchant bars	33.00	445
Angles	35.22	475
Normal beams and profiles	35.22	475
Plates, ship and tank, 10 millimeters and thicker	45.23	610
Plates, bridge and tank, 5 to 10 millimeters	48.20	650
Sheets, black, 3 millimeters	51.16	690
Sheets, blue annealed, 2 millimeters	54.13	730
Shafting, cold-drawn, 40 to 60 millimeters	61.17	825
Bars, 2 per cent nickel steel	103.81	1400

All prices are f.o.b. furnace or works.

Belgian Market

Prices Last Reported

	$	Francs per metric ton (2205 lbs.)
PIG IRON		
Basic bessemer, Belgian	16.38	235
Basic open-hearth, Belgian	16.73	240
Gray forge, Belgian	16.38	235
Foundry, No. 3, Belgian	18.82	270
Foundry, No. 3, Luxemburg	18.47	265
Foundry, No. 3, Lorraine	18.47	265
SEMIFINISHED STEEL		
Blooms	22.65	325
Billets	24.05	345
Sheet bars	25.09	360
Wire rods	36.24	520
FINISHED MATERIAL		
Standard rails	31.02	445
Merchant bars	30.32	435
Normal beams and profiles	26.83	385
Plates, 5 millimeters and thicker	32.06	460
Sheets, black, 3 millimeters	35.55	510
Sheets, galvanized, 1 millimeter	98.97	1420
Plain wire	44.96	645
Galvanized wire	61.68	885
Wire nails	35.20	505

All prices are f.o.b. furnace or works.

and Australia. The modern form of combination carried through in this industry appears to have had a very good effect. The tin plate industry of South Wales also shows improvement to which it is believed the recent agreement between the steel manufacturers and the tin plate mills has contributed. This arrangement involved a minimum price for tin plate of 19s 3d ($4.30) based upon tin bars at £7 ($31.29). But the selling price has become 19s 6d ($4.35) with some people asking £1 ($4.47) per ton. An important element in the situation, however, is the considerable quantity of foreign steel coming in obtainable at £5 12s ($25.03). It seems inevitable, however, that prices will be weakened by this competition. As the result of a consultation by a joint meeting of the Welsh Industrial council for the tin plate industry which answers the purpose of a wage board for the trade, the 7½ per cent bonus repeatedly conceded by the employers owing to the basis of the sliding scale having sunk below zero has been extended for another three months until Feb. 5.

Japan Feels Competition from India

Foreign Special Service

TOKIO, Japan, Nov. 13.—The general business depression and the growing competition from Indian producers, who not only are endeavoring to compete with Japanese interests with a low priced supply of pig iron, but expect to open tin plate mills to compete with British and American interests, in the near future, has caused Japanese producers to seek some measures of relief. It is the opinion in the iron and steel trade that the first measure to be adopted will be the amalgamating of the coal and iron ore purchasing departments, which, it is believed, will effectively reduce the cost of production. The electrification of the stacks probably will be the next remedy adopted.

The recent plans for the combining of Japanese furnace interests failed to

materialize. However, the necessity of reducing the cost of production has been fully realized and several manufacturers have reported a reduction of 5 yen in production costs. The failure of fall trade to materalize has caused many to go further in their endeavors. The government steel works has given its aproval of the proposed combination for buying ore and coal. The Kamaishi furnaces, one of the foremost groups in Japan, have already started the electrification of stacks, and it is expected that others will follow in a short time.

In the iron market small lot purchases are being made by consumers whose stocks are low, but holders are troubled with the slackness of actual business. The growing difficulty of collections renders many negotiations useless. In the steel market the competition of the Indian mills is keenly felt. Importing firms are in receipt of advices from Calcutta to the effect that new tin plate mills will soon be in full blast in India, and that prices will be much lower in Japan, from that source. American tin plate stocks which have accumulated are beginning to decline somewhat.

Round bars continue in good demand with high prices. Rails are becoming a new feature in the steel trade since the railroads and tramways, which have delayed construction work, due to the high cost of equipment, are starting to build new roads. However, this activity is not sufficient to offset the general gloom now hanging over the steel trade. Prices in both iron and steel markets are weak and unstable. No. 1 Japanese iron is quoted at 67 yen ($32.24). No. 2 at 63 yen ($30.25) No. 3 at 58 yen ($26.76). No. 1 Hanyang (Chinese) is 63 yen ($30.24) and No. 3 Cleveland is 72 yen ($34.56). In the steel market round bars are quoted at 460 yen ($2.213) per 10 kwamme, while flat and square bars are 4.70 yen ($2.23). Plates are 4.20 yen ($.02) and sheets 7 yen ($3.36). Ten kwamme equal 82.67 pounds. Tin plate holders quote 25 yen ($16.80) per case of 224 pounds.

German Pig Iron Prices Again Increased

European Special Service

DUSSELDORF, Germany, Nov. 9.—Pig iron prices have again been increased but this has no significance outside of Germany on account of the continued depreciation of the exchange. The increases which have been made effective average 33,000 marks ($4.60) a ton making Westphalian hematite 73,662 marks ($10.30), with No. 3 foundry 73,592 marks ($10.25) and Luxembourg foundry 68,730 marks ($9.60). These increases are hardly enough to keep pace with the collapse of the exchange.

Spiegeleisen containing 8 to 10 per cent manganese is now quoted 77,356 marks ($10.80) and 10 per cent ferrosilicon is 95,000 marks ($13.30).

Prices of semifinished and finished steel are advancing in proportion and

Mark—$0.00014

billets are being sold for delivery at the mills' convenience at 110,480 marks ($16), with bars, plates and shapes at 127,410 to 164,180 marks, equivalent to 0.81c to 1.05c per pound.

It is expected that fuel prices will be doubled before the middle of November. Furthermore, the coal miners are not satisfied with present wages and unless a material increase is granted, the general feeling is that a strike may take place. Production of coal in October was more satisfactory than in preceding months.

Depreciation in the exchange has stimulated the demand for iron and steel products although the weight of orders would not be so noticeable if the furnaces and mills were able to produce their normal tonnages.

Foreign ores are being freely offered at practically prewar figures but the sellers are avoiding large contracts on account of possible financial complications on the part of the German purchasers. Herr Thyssen recently gave out a statement in which he said that at the present time the earnings of his works in foreign currency are not more than sufficient to pay for the absolutely necessary imports of ore and fuel.

Railway freight tariffs probably will be doubled again on Dec. 1. The German works are feeling French and Belgian competition rather severely in their export trade.

French Iron and Steel Market Quiet

European Staff Special

Office of IRON TRADE REVIEW,
224 Rue de Rivoli,

PARIS, Nov. 10.—A quieter tone prevails in the French iron and steel market. The larger consumers who have been buying heavily of late appear to have covered their requirements as little new business is now being placed. Iron and steel producers are not inclined to commit themselves on 1923 business as steadily rising fuel costs together with the slump in French exchange must eventually result in higher prices. The recent fall of the franc will undoubtedly stimulate French exports, but this advantage is offset to some extent by increased costs of raw materials, such as coal from England and iron ore from Sweden.

Despite the unfavorable financial and political situation, iron and steel makers are fairly busy, particularly in the East

Franc—$0.065

and Lorraine where practically all the larger interests have sufficient orders to insure continuous operation for some time ahead.

Receipts of reparations coke from the Ruhr during October fell short by about 60,000 tons of meeting the program laid down by the commission.

The pig iron market is active. The domestic demand is brisk and export business is satisfactory in volume, although orders are not as numerous as they were several weeks ago. Price adjustments continue to be upward and No. 3 chill-cast foundry pig has recently been sold as high as 240 francs ($15.60). The broadening of the gap between the pound sterling and the franc has eliminated English competition on hematite in the French market. French furnaces are now quoting the product at 310 francs ($20.20).

Semifinished steel market is firm. Export orders are being received from England and Germany. The following export prices have been quoted f.o.b. Antwerp: Ingots, 310 Belgian francs ($20.20); blooms, 320 Belgian francs ($20.85); sheet bars, 375 Belgian francs ($24.35). The Comptoir des Poutrelles maintains its base price of 475 francs ($30.85) per metric ton for beams, but certain extras having been increased, jobbers have raised their prices 10 francs ($0.65) a ton. The demand for plates and sheets is improving. Large orders for plates have been received from the devastated regions and the shipyards have also sent in a number of orders. Light gage sheets continue to be imported from England and Belgium.

Canadian Iron Market Continues Quiet

Foreign Special Service

TORONTO, Ont., Nov. 20.—The pig iron market is holding the same level as during the past two or three weeks in relation to demand. Melters in Ontario and Eastern Canada seized the opportunity of laying in stocks of the low priced English and Scotch iron when offered a month ago resulting in consumers having sufficient stock for the last quarter and some for the first quarter. Blast furnace representatives say that the present demand is almost entirely for spot delivery and orders confined to one or two cars. Production ac-

tivities have not increased with only four furnaces blowing out of a total of 20, but it has been reported that a couple additional furnaces will be started before the close of the year. Prices now holding enables Canadian producers to compete with British exporters. No. 1 (2.25 to 2.75 silicon) and malleable are quoted at $33.80 and No. 2 (1.75 to 2.25 silicon) at $32.80, Toronto. Carron and Summerlee iron, which is said to be piled in large tonnages in Montreal, are quoted at $33 to $35 per ton dock, Montreal.

The demand for iron and steel continues active and mills throughout Ontario and Eastern Canada are said to be making good progress. In the Toronto market an active demand exists for bars, both for spot and future delivery. Mills have practically nothing in the way of bars to offer for immediate shipment, consumers are placing orders for future shipments. Prices are holding firm with mills offering bars at 2.60c, Toronto. Structural shapes are also in good demand with contractors and jobbers buying in good tonnages. Shapes and beams are quoted at 2.40c, Toronto. The demand for plates is showing improvement. Car builders are asking for good tonnages of plates and tank makers and shipbuilders are also entering the market more freely. From 5000 to 6000 tons of plates will be required for tanks to be constructed at Calgary, Alta., for the Imperial Oil Co., in connection with proposed plant to be erected there. Plates are quoted at 2.30c, Toronto. The demand for sheets is easier, but mills continue to close fairly good orders on this account. Mills producing galvanized sheets report an active demand, but black sheets are falling off. Black sheets, No. 28 gage are quoted at 3.35c, and 28 gage galvanized at 5.50c, Toronto.

Business in the iron and steel scrap metal market continues weak, with demand almost entirely for spot delivery. Mills are taking in small tonnages of turnings and heavy melting steel for which dealers continue to offer $11 and $7 per gross ton, Hamilton, respectively. Boiler plate is in limited demand and dealers are picking up odd lots at $8 per gross ton, Toronto. Dealers are paying $16 per gross ton, Toronto, for iron car wheels and wrought axles, but there is little demand. A strong demand exists for machinery cast. Dealers are offering $18 per net ton, Toronto, for machinery cast. Stove plate is not active with dealers paying $14 per net ton, Toronto.

Scrap Prices Go Lower

(*Concluded from Page 1388*)

versing the condition that has prevailed for a few months past. Consumer buying is negligible as indicated, being upon a hand-to-mouth basis, steel foundries taking single carloads and iron foundries buying practically nothing. Some sales of heavy breakable cast are noted at a maximum of $20; No. 1 cupola still sells in small lots at $24; iron car wheels are 50 cents lower than a week ago, and for old iron axles $29 is the maximum paid or offered this week. Steel specialties still are weak and nothing higher than $22 is obtainable.

Mills Not Buying Extensively

Buffalo, Nov. 21.—Dealers are busily engaged filling scrap orders on hand, most of which have been taken some weeks ago at higher prices than are ruling in the present market. Mills are not displaying any anxiety to buy extensively now. They will buy for delivery after the first of the year but dealers will not do business on this basis. There is some leisurely buying by mills but the lots are small. The dealers' asking price for heavy melting steel is $19 to $19.50. In transactions among themselves, $18.75 to $19 is being paid for this material. A fair outside demand exists for most grades, including turnings and borings, car wheels and cast scrap.

Prices Generally Lower

Cleveland, Nov. 21.—Demand generally is lacking in the scrap trade and the market is soft. Heavy melting steel is down from $19 and $19.50 to $18.50 and $19; old steel rails for melting are down 50 cents to $17.50 and $18; old steel rails for rolling are down $1 and $1.50 to $21 and $21.50; drop forge flashings under 10 inches from $13 and $13.25 to $12.50 and $13; drop forge flashings over 10 inches, from $12.75 and $13 to $12.25 and $12.50; railroad malleable from $20 to $21 to a nominal quotation of $20; heavy cast from $17 and $17.25 to $16.50 and $16.75; pipes and flues from $14.75 and $15 to $14 and $14.50. On the other hand new demand for mixed borings and turnings has strengthened that market, a round tonnage sale having been made in Cleveland within the past few days. This has resulted in a mark up from $14.75 and $15 to $15.50 and $16. Heavy melting steel also is down in the Mahoning valley being quoted 50 cents off at $20.50 to $21.

Car Shortage Hurts Sales

Cincinnati, Nov. 21.—A severe car shortage is being felt by local scrap dealers and while buyers have shown no recent inclination to increase their commitments there are known requirements that would be covered if the prospective buyers could be assured shipments. The market is easy and prices have declined throughout the list from 50 cents to $1.

More Reductions Made

St. Louis, Nov. 20.—Further price reductions throughout the entire list have featured the scrap market. Sales of all grades are at a minimum. Offerings are more plentiful but the mills and foundries are taking next to nothing. Dealers have been obliged in many instances to take in material and lay it down in their yards. The railroads have been moving their scrap with surprising rapidity considering the delays and backwardness in forwarding of other freight. Offerings by the carriers are in fair volume and it is understood that several roads in this territory are preparing to market additional tonnages in the near future. Heavy melting steel was marked down $1 to $15.75. Cast grades felt the edge of the pruning knife, No. 1 railroad being down $2 to $20. Steel and iron car axles were off $2 and $1.50, respectively, and malleable grades declined $1.50. The Harry Benjamin Equipment Co. has purchased from the St. Louis Southwestern railroad 100 miles of 75-pound relaying rails and angle bars.

Southern Market Still Weak

Birmingham, Ala., Nov. 20.—With little selling being done the scrap market continues weak. Dealers are not worried however and are looking for recuperation of the market. Considerable scrap still is moving but it is on old orders. Yards are being kept up in the belief that the demand will take on some improvement as 1923 needs become more apparent.

October Sheet Production Reaches High Point

Production of sheets in October by independent mills in comparison with capacity, reached the highest point since statistics regarding the sheet industry were made public beginning with February, 1920. Output in October was 91.8 per cent of capacity, or 243,476 tons.

Compilations by the National Association of Sheet and Tin Plate Manufacturers show that production of sheets by those contributing increased 11.4 per cent in October over the September record; shipments increased 9 per cent and sales increased 3.8 per cent. The unfilled tonnage on hand the first of the month, however, decreased 8.3 per cent while finished stock on hand awaiting shipment remains approximately the same as on Oct. 1. The production figures follow:

	Oct., 1922 Net tons	Sept., 1922 Net tons
Total sales for month.....	208,916	188,863
Total production	243,476	202,600
Total shipments	223,874	190,027
Unfilled tonnage as at Nov. 1 and Oct. 1.....	376,394	378,574
Finished stock on hand awaiting shipment	108,291	102,198
In stock, unsold.....	20,690	21,241

Sales in October were 78 per cent of capacity reporting; production 91.8 per cent; shipments, 84.4 per cent; unfilled tonnage Nov. 1, 142 per cent; finished stock awaiting shipment, 40.8 per cent, and sheets in stock unsold, 7.8 per cent.

The total number of hot mills in the United States is 658, having a capacity for October, 1922, of approximately 385,000 tons, and the percentage to which the figures shown are related is about 68.9 per cent.

All Offer Manganese Ore

New York, Nov. 21.—In view of the long absence of American consumers in the manganese ore market, foreign producers have caught up in their deliveries to a considerable extent. Brazilian, Indian and the Caucasian shippers now all are offering ore for prompt shipment. The price quoted by all is 29 cents per unit, c.i.f. tidewater. This figure is not being tested, however, in view of the fact that all American users have stocks sufficient to last them a long time. It appears unlikely that there will be any new business in manganese ore at least before Jan. 1.

Autumn Trade Peak Is Passing

Unusual Seasonal Activity May Be Followed by Some Letdown During Winter Months—Main Trend Continues Strongly Upward, However—Building Awards Up in October—Price Level Rises Sharply

BY JOHN W. HILL, FINANCIAL EDITOR

THE outlook continues good for sustained underlying improvement in business. This does not preclude some reaction this winter from the unusually strong seasonal upturn of trade this fall. Even in times of great business prosperity there is some letdown in activities, during the cold months between fall and spring.

That the peak of fall trade was reached in October and is now passing is indicated by the drop in car loadings for the week ended Nov. 4. As shown by the Business Trend chart the total for that week was 994,827, a decline of 20,000 from the preceding week. It represented, however, the largest volume of cars ever loaded in this country during the first week of November.

The extent of widespread recovery is pictured in the Monthly Business Index curve on the opposite page. At 129 this compisite of business activities is at the highest level touched since October 1920. The advance during October was greater than usually is true of that month.

One of the most interesting movements in October was the gain in the square feet total of building awards in 27 northeastern states as reported by F. W. Dodge & Co. As shown in the Business Trend building construction chart total for all building increased over September. Building usually undergoes a seasonal slump at this time of the year. The increase in spite of higher material and labor costs, reflects the great shortage of building in the country and suggests that activities will continue on at least a fairly large scale next year. Total awards gained 12 per cent over October 1921 and 88 per cent over the same month in 1920. Of great significance was the further gain in industrial awards. This reflects the industrial expansion that is inevitable as business improvement continues.

Another component of the Business Index chart is Bradstreet's wholesale prices. This index gained over 6 per cent in October. The rise from the 1921 low point has been 25 per cent. This is more than the advance for all of the 10 years from 1903 to 1913. In fact, in no previous peace time period have prices ever moved up so rapidly as in recent months. More active trade and low stocks of goods, rather than unhealthy inflation have caused the rise.

A broad buying movement is now underway in many lines and if this develops into commodity speculation and hoarding unstable inflation will result. Credit facilities are sufficient to permit of such a movement. With the country's monetary gold stocks totaling $3,900,000,000 or nearly half the world's supply, the federal reserve system has sufficient free gold to support further credit expansion of over $15,000,000,000. This large stock of gold is one strong reason why American prices will not soon return to prewar levels.

Index to Business Trend Charts

THIS ISSUE

Subject	Page
Business Index	1403
Railroad Freight Traffic	1404
Security Prices	1404
Building Construction	1405
Railroad Earnings	1405
State of Credit	1405
Comparison of Employment	1406

REFERENCES

Automobile Production	Nov. 16
Car Orders	Nov. 16
Coal Production	Nov. 16
Freight Car Situation	Nov. 16
Iron and Steel Foreign Trade	Nov. 16
Monthly Pig Iron Index	Nov. 16
Steel Orders	Nov. 16
Foreign Exchange	Nov. 9
Foundry Pig Iron Market	Nov. 9
Iron and Steel Price Parity	Nov. 9
Steel Earnings	Nov. 9
Wage Factor	Nov. 9
Wholesale and Retail Prices	Nov. 9
Commodity Prices	Nov. 2
Cotton Consumption	Nov. 2
Farmer Purchasing Power	Nov. 2
Foreign Trade	Nov. 2
Monthly Alien Migration	Nov. 2
Bank Clearings	Oct. 26
Iron and Steel Production Rate	Oct. 26
Structural Awards	Oct. 26
Independent Sheet Situation	Oct. 26
Prices and Failures	Oct. 26
Iron and Steel Price Index	Oct. 26
Copper Prices	Oct. 12
U. S. Crop Production	Sept. 21
Building Cost Index	Aug. 31
International Steel Market	Aug. 31
Long Time Trend of Wages	Aug. 3
Steel Output Per Capita	June 8
Dollar Purchasing Power	May 4
112 Years of Prices	March 30

The Barometer of Business

WEEKLY COMPARISON

	Last week	Week before	One month ago	One year ago	1913
Business failures	431	387	442	536	356
Cash Ratio Fed. Res. System	75.2	76.4	75.2	71.8	.....
Loan rate, 4-6 months, N. Y. (per cent)	4½-4¾	4½-4¾	4¾-4½	5-5¼	4¾-5
Aver. 20 Ind'l. shares	$90.12	$92.79	$97.19	$73.86	$76.18
Aver. 20 Rail shares	$85.86	$89.28	$93.09	$74.28	$102.87
Aver. 40 bonds	$78.68	$79.40	$80.53	$74.60	$93.00
Car loadings (week ended Nov. 4)	994,827	1,014,480	968,381	837,576	*915,615
Bank debits 164 cities (000 omitted)	$9,243,928	$8,203,660	$9,865,022	$7,693,635	.....

*1920.

FOREIGN EXCHANGE (Demand)

	Normal	Nov. 21 (close)	Week before	Month ago	Year ago
Sterling	$4.86	$4.49½	$4.47	$4.44	$3.93
Francs	19.3c	7.41c	6.54c	7.12½c	7.22c
Lira	19.3c	4.75c	4.77c	4.11½c	4.09c
Marks	23.8c	0.01¾c	0.01c	0.02⅞c	0.37c

MONTHLY COMPARISON

	October	Month before	Year ago	Monthly average 1913
Dodge building awards in 27 states	$253,137,000	$271,493,000	$222,480,000	$71,450,000
Business failures:				
Number	1708	1566	1733	1336
Liabilities	$34,647,438	$36,909,157	$53,059,000	$22,723,000
Excess of exports	†$85,000,000	$31,000,000	$146,490,953	$54,406,000
Excess of gold imports	†$27,602,000	$18,136,355	$63,636,512	*$630,716
Bureau of Labor Price Index	154	153	142	100
Bradstreet's Price Index	144.4	135.3	121	100
Economist's British Price Index	4264	4189	4588	2717
Cost of Living Index	157.1	155.6	163.7	100
New incorporations	$651,577,390	$664,000,000	$508,394,000	$172,301,000
Railroad net earnings	†$58,000,000	$53,000,000	$87,174,000	$59,900,000

†September. *Monthly average export excess.

The Business Trend

November 23, 1922

TRADE TODAY, TOLD BY IRON TRADE REVIEW CHARTS

GENERAL SITUATION—Exceptional activity of trade revealed by strong rise of Monthly Business Index for October; month usually marks peak of Autumn trade; main trend distinctly upward, but some seasonal reaction to be expected this winter.

FREIGHT TRAFFIC—Drop of 20,000 car loadings for week ended Nov. 4 may reflect passing of peak in goods movements; total highest for first week in November on record.

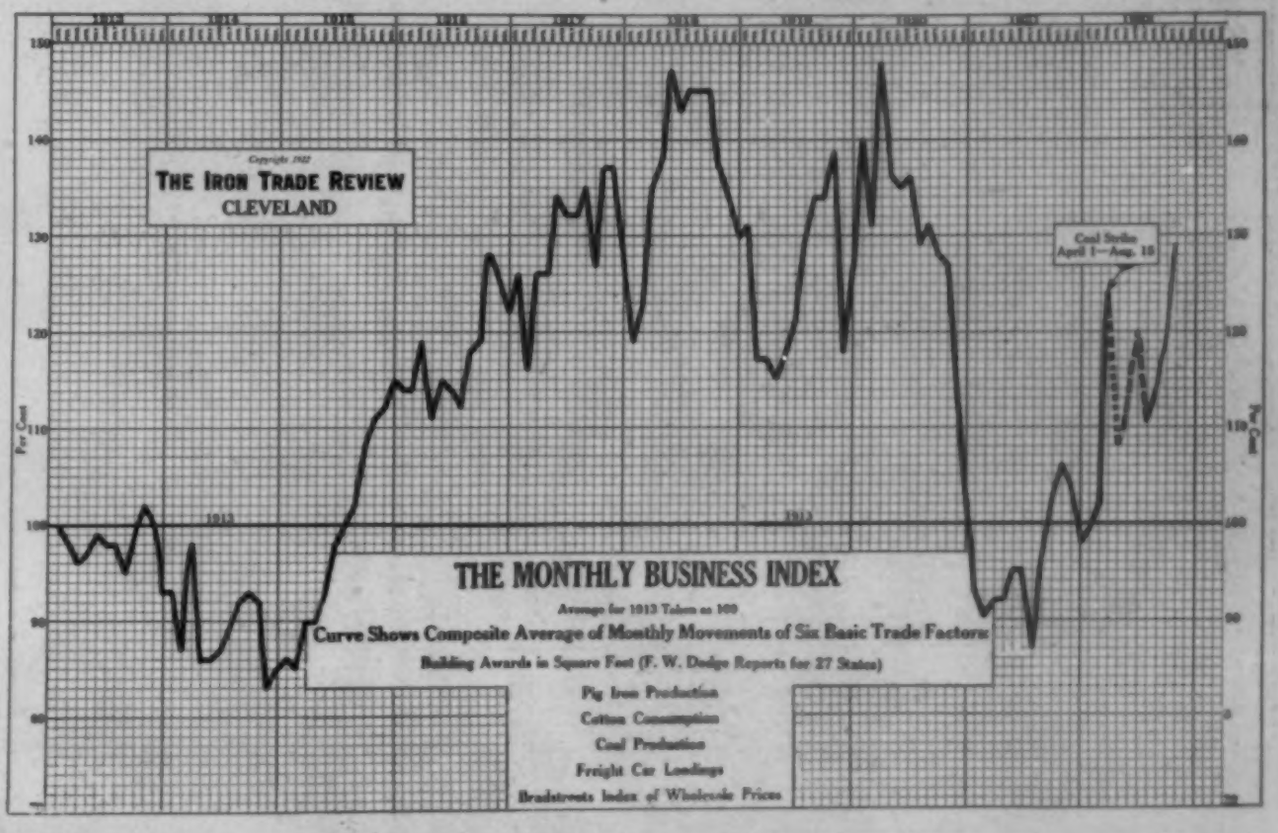
SECURITY PRICES—Fifty representative shares lose nearly all of ground gained since last August; reaction largely speculative without business significance.

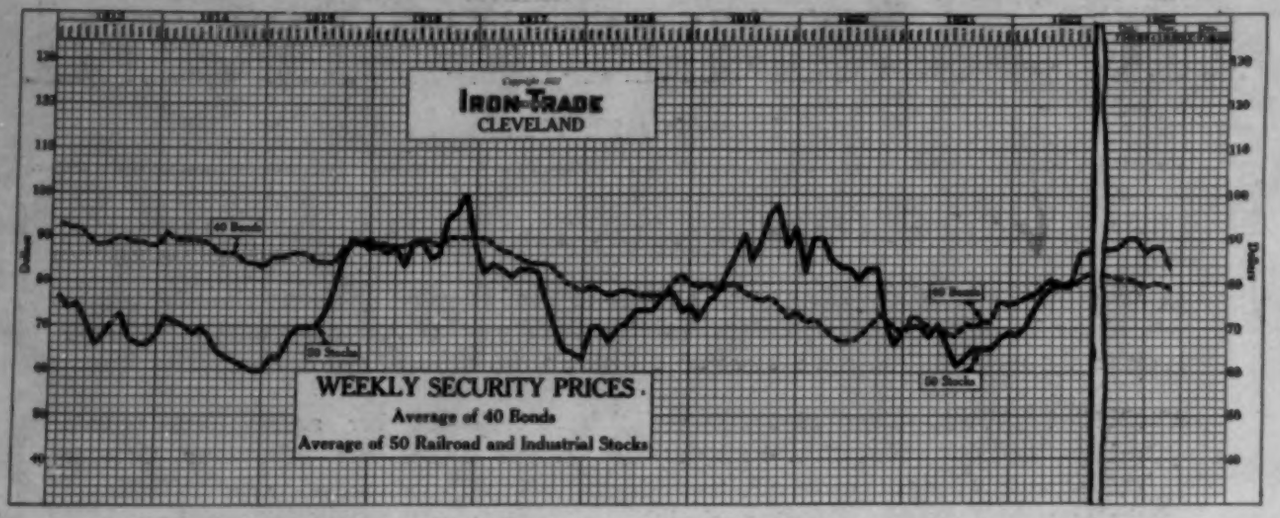
STATE OF CREDIT—Autumn credit demands cause 50 per cent increase in federal reserve system's rediscounts; total 70 per cent less than in 1920; needs now diminishing.

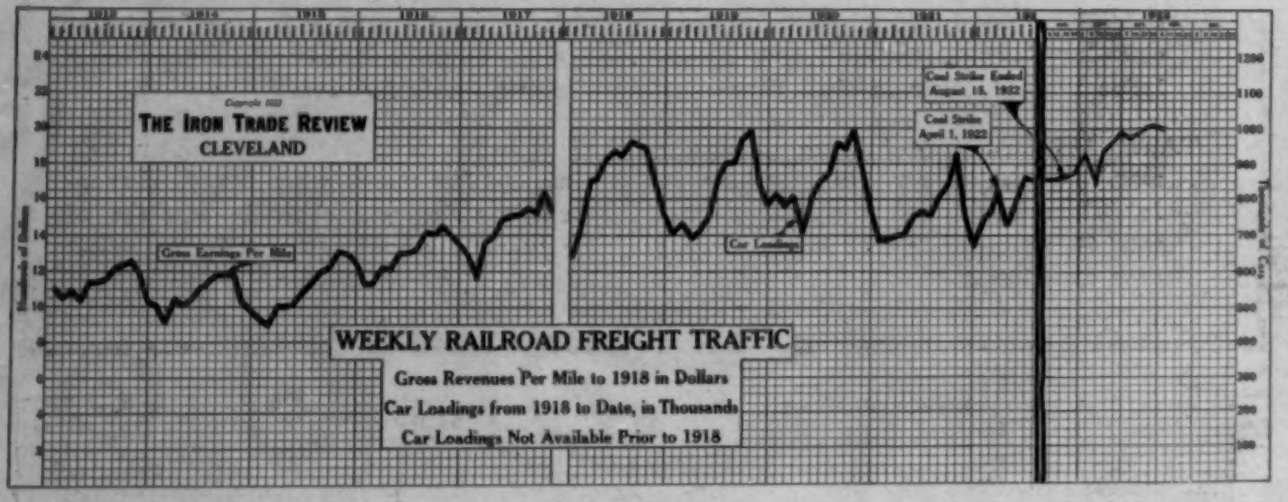
BUILDING—October square feet awards above September; gain over October 1921 is 17 per cent and over 1920, 88 per cent; rise in industrial building continues.

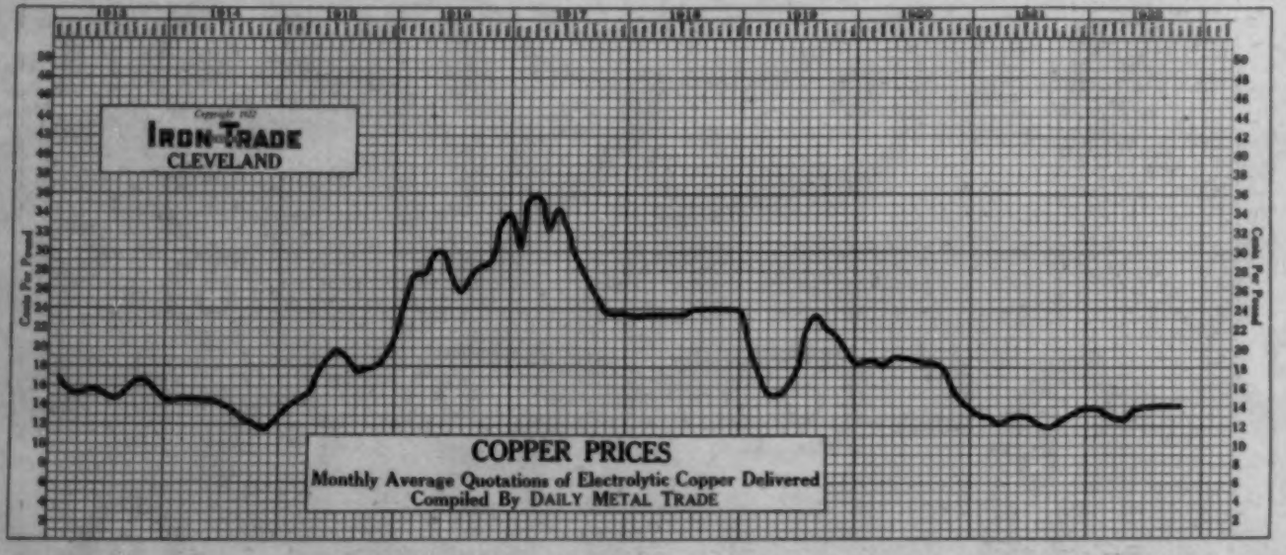
EMPLOYMENT—Chart pictures the rapid rise in employment in iron and steel and other industries; labor shortages and higher wages forecast.

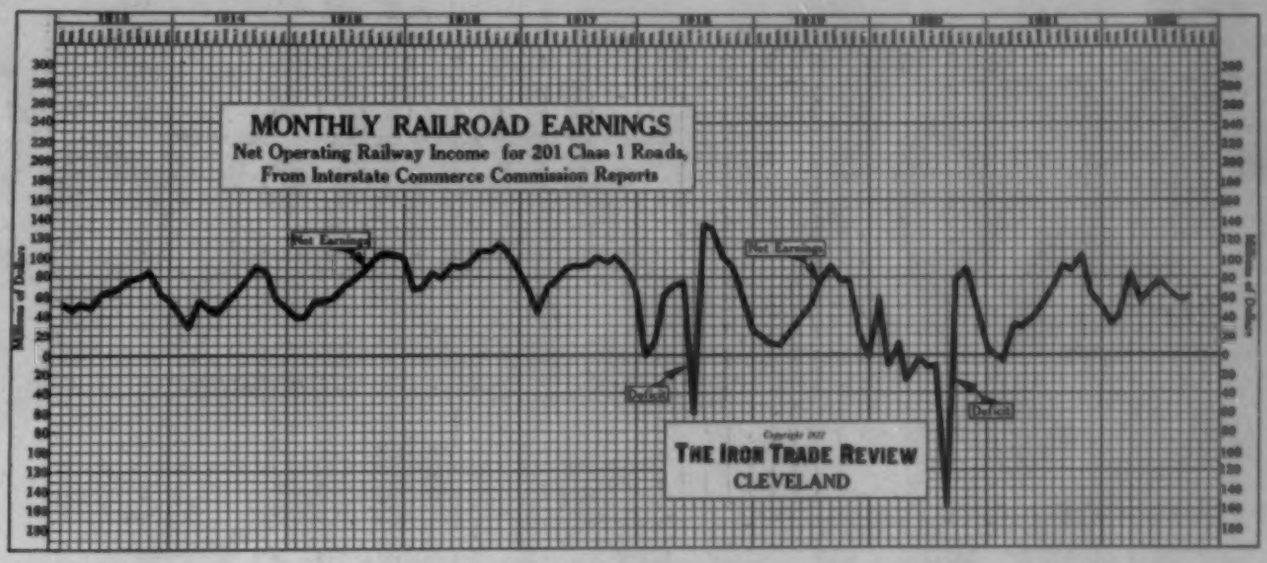
RAILROAD EARNINGS—September marked last month when effects of shopmen's strike will show in earnings of railroads; subsequent months to reflect heavy traffic movements.

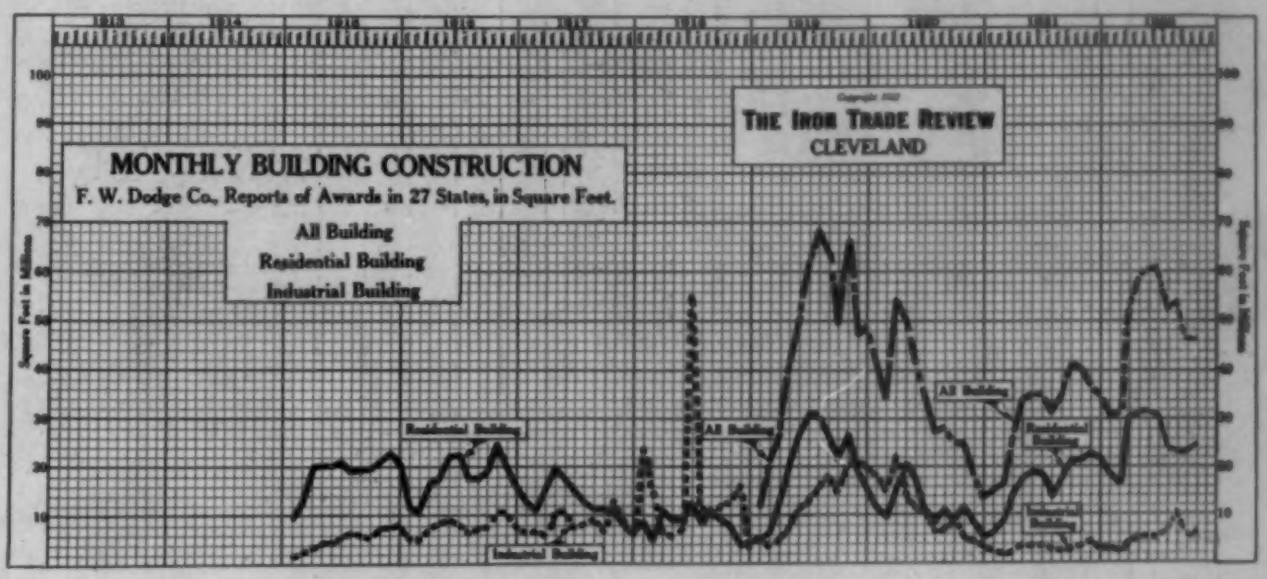

Copyright 1922
THE IRON TRADE REVIEW
CLEVELAND
Coal Strike April 1—Aug. 10
THE MONTHLY BUSINESS INDEX
Average for 1913 Taken as 100
Curve Shows Composite Average of Monthly Movements of Six Basic Trade Factors:
Building Awards in Square Feet (F. W. Dodge Reports for 27 States)
Pig Iron Production
Cotton Consumption
Coal Production
Freight Car Loadings
Bradstreets Index of Wholesale Prices
Per Cent
1913
1913

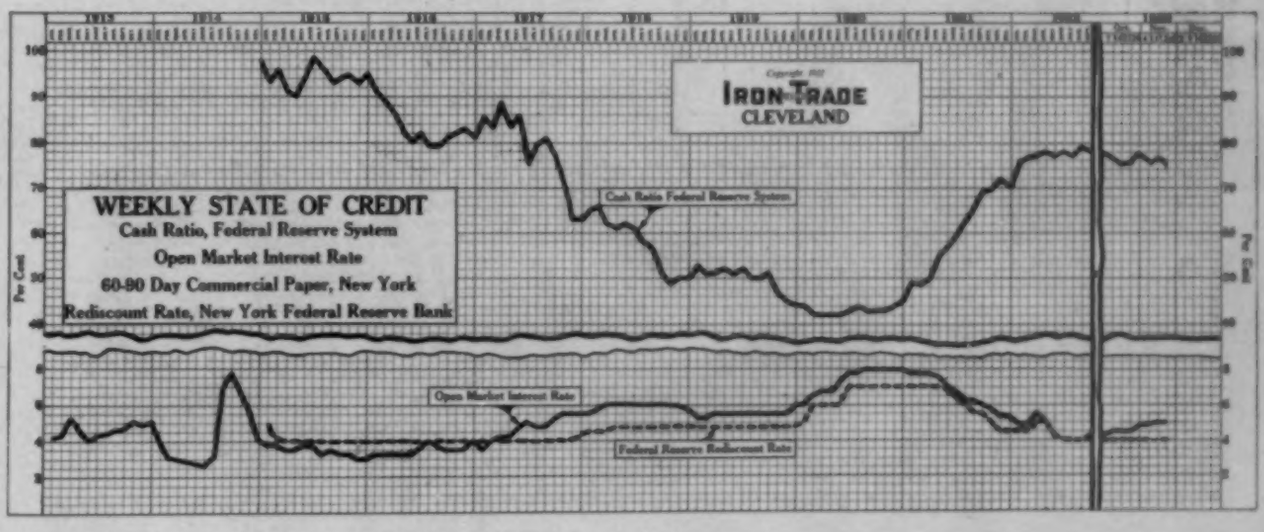

IRON TRADE
CLEVELAND
40 Bonds
50 Stocks
40 Bonds
50 Stocks
WEEKLY SECURITY PRICES.
Average of 40 Bonds
Average of 50 Railroad and Industrial Stocks


THE IRON TRADE REVIEW
CLEVELAND
Gross Earnings Per Mile
Car Loadings
Coal Strike Ended August 15, 1922
Coal Strike April 1, 1922
WEEKLY RAILROAD FREIGHT TRAFFIC
Gross Revenues Per Mile to 1918 in Dollars
Car Loadings from 1918 to Date, in Thousands
Car Loadings Not Available Prior to 1918


IRON TRADE
CLEVELAND
COPPER PRICES
Monthly Average Quotations of Electrolytic Copper Delivered
Compiled By DAILY METAL TRADE


MONTHLY RAILROAD EARNINGS
Net Operating Railway Income for 201 Class 1 Roads,
From Interstate Commerce Commission Reports
Net Earnings
Deficit
Net Earnings
Deficit
THE IRON TRADE REVIEW
CLEVELAND


MONTHLY BUILDING CONSTRUCTION
F. W. Dodge Co., Reports of Awards in 27 States, in Square Feet.
All Building
Residential Building
Industrial Building
THE IRON TRADE REVIEW
CLEVELAND
Residential Building
Industrial Building
All Building
All Building


WEEKLY STATE OF CREDIT
Cash Ratio, Federal Reserve System
Open Market Interest Rate
60-90 Day Commercial Paper, New York
Rediscount Rate, New York Federal Reserve Bank
IRON TRADE
CLEVELAND
Cash Ratio Federal Reserve System
Open Market Interest Rate
Federal Reserve Rediscount Rate

COMPARISON OF EMPLOYMENT IN IMPORTANT INDUSTRIES
U. S. Employment Service Reports
Iron and Steel and Products
Land Vehicles
Metals and Metal Products
Railroad Repair Shops
Textiles and Their Products
TOTAL EMPLOYMENT
Reports From 1428 Companies in 65 Cities With 501 or More Employes
Copyright 1922 by IRON TRADE CLEVELAND
In Thousands
July Aug. Sept. Oct. Nov. Dec. Jan. Feb. Mar. April May June July Aug. Sept. Oct. Nov. Dec. Jan.
1921
1922

Training Steelworks Foremen-I

First Requirement Is That Management Take Initiative and Participate in Educational Courses for "Non-coms"—Foremen Indifferent Without This Stimulus—What Experience in Many Mills Teaches

BY B. M. NUSSBAUM

"MY COMPANY is willing to spend any reasonable amount on foreman training," said the superintendent of a Pennsylvania rolling mill, "but we can't seem to interest our foremen in education. So long as there are pool parlors and movie theaters and other spare-time interests, there isn't much chance for a foreman's class. We offered to pay all the expenses. All the foremen had to do was to study."

The management had called the foremen together and the president of the company had addressed them, explaining that the company had decided to make an educational opportunity available for the foremen. The company would be glad to enroll all who desired the training.

"Of course we couldn't bring any pressure to bear," said the superintendent. "It would spoil the whole thing and undermine our relations with the foremen if we tried to force them against their wills, or even tried to urge them. We just put the proposition up to them as an advantage we were willing to provide on a take-it-or-leave-it basis. Only three of the foremen signed up. There were 37 present at the meeting!"

"Did any of the plant executives indicate their personal interest in the class, any of them enroll?" the writer asked.

"No, none of us enrolled. It was a foreman's course, nothing that would interest me or the manager or any of the office men."

Average Foreman Indifferent

Under the circumstances it was not strange that the foremen did not respond to the "educational opportunity." The average foreman is not looking for educational opportunities. There are exceptions, the occasional ambitious fellow who is eager for every chance at an education and the plodders who will keep plugging for more education in spite of all handicaps. But the average run of foremen are not of these types; three out of 37 is a fairly generous proportion.

The average foreman is fairly well satisfied with himself. He may kick about the stupidity of his men or about the policies of the management, but of his own abilities and achievements he is rarely critical. He has risen to the headship of a department, and while he may feel that he is overworked or poorly paid, he rarely feels that his condition is his own fault, and with his pride as "boss" of his department goes a certain sense of self-complacency and satisfaction. Therefore, when an educational opportunity is offered their natural response is "we don't need education. The fact that we've been promoted to foremen proves that we've mastered our jobs." There is an affront to the average foreman's pride in inviting him to go back to school.

Yet foremen do sign up for training; in spite of pool and movies and other diversions, they do give their spare time to studying foremanship. The writer knows the results in more than 600 plants in the United States and Canada where more than 30,000 foremen have been trained according to a group-study plan. The training, moreover, called for real work on the part of the foremen-students; they had to study text books, solve plant problems based on the teaching of the texts, attend lectures and participate in conferences; and all this over a period of three months. The training was a real training and called for many spare hours and close application on the part of the foremen.

My experience shows that the success of the offer of foreman's training in these plants rested largely on two things: First, on the leadership of the management, and second on the participation of the management in the training program. A necessary condition to success, of course, was the selection of a training plan that was adapted to the foremen's needs and limitations. Obviously, no amount of enthusiasm and leadership on the part of the management will be able to carry through to success a program which the foremen are incapable of following. But assuming that a proper choice of study-material and method of training has been adopted by the management, then in order to get the program accepted by the foremen and actively followed by them, the two conditions named are necessary.

The leadership of the management is absolutely essential. Experience shows that foremen will not seek training. The management must do the seeking for him, and must then exercise its natural faculty of leadership to bring the foremen to accept the training program.

Management's Indorsement Necessary

This does not mean that the idea must be forced. It would certainly be unwise to attempt to drive foremen to take training by penalizing those who stay out. But if a plant management offers an educational opportunity to its foremen, it ought to give that offer all the force of its indorsement and approval. It presumably has assured itself beforehand that the training system is a good one, well adapted to its plant conditions, and that it is something calculated to improve the efficiency of the foremen both to their own benefit and to that of the plant. Merely offering an opportunity, on a take-it-or-leave-it basis, is not the same as recommending it as a good thing, something that the management believes will help every man who enrolls. Leadership is needed in getting plant policies across, in introducing improvements, in speeding up production. Similarly the management must exercise its leadership if it is to get any educational policy across, if it is to improve the quality of its foremen and speed up their ability as the "non-coms" of industry.

Merely offering a course without charge is not a convincing argument to the average foreman. As a matter of fact, it is likely to cheapen the value of the offer in his estimation. Also it represents a paternalistic attitude that many employes resent. The best results in foremen training have been received where the foremen had to pay some money for the training. A plan that has worked well in many plants is to split the tuition fee, the foreman paying half and the company paying half. A further refinement of this plan is the provision that for every foreman completing the training

---

The author is vice president, Business Training Corp., New York. A second and final instalment of this article will appear in an early issue.

with a grade above a given minimum, the company will refund the amount of fee paid by him. This puts the thing on a competitive basis, and in several thousand cases has stimulated the foremen-students to unusual study efforts and resulted not only in a high percentage of completion of the training work, but also in a marked improvement in the attitude of the foremen toward the plant. The foremen take pride in the records made by them in their training, and also in the fact that the company has recognized these high records and rewarded them.

Participate in Training

The second condition to the successful presentation of a training plan to foremen is that the management participate in the training. The best results are achieved where the participation amounts to actual enrollment in the course by representatives of the higher management. The writer recalls a foremen's training group in a Canadian plant where the company manager, the factory manager, two chemists, the superintendent, and office manager all enrolled, actively studied the course material, attended lectures and group meetings, finished up their problem work, and in fact did everything that the course required them to do. Truly remarkable results were accomplished in this training group. The foremen felt a sort of responsibility that they could not have felt if the class was just a group of foremen. The fact that these higher executives were submitting to the training put them on their mettle, made them appreciate the value of the training.

An interesting sidelight on the Canadian group is reflected in the remarks made by these higher executives at the conclusion of the course. Every one of them said it had been one of the most interesting and valuable experiences of their business lives; they found much in the foremen's course that was applicable in their own work. Most important of all, through their contacts in the course they had established firmer relationships with the foremen, and the result was a better understanding all around.

There are many other instances which might be described in which managers and superintendents have enrolled in training groups with foremen. Such enrollments always give a new interest to the training in the eyes of the foremen. I have sat in at the opening meetings of a training program, where the proposition was first outlined and enrollments solicited. As soon as the superintendent, assistant superintendent, or some other high executive stood up and gave his name for enrollment, the pace of the meeting visibly quickened, the foremen fell into line, and the group was soon completed. The fact is that foremen don't like to be segregated by themselves, like a class of apprentices, but if the thing is something the "boss" is interested in to the point of joining in the group and following the study program, why then it must be something worth a foreman's time and interest. That's the way they reason, and it is not illogical reasoning.

Of course, it is not always possible for the manager or superintendent to submit to all the discipline and perform all the work required by a study course. After all, we must recognize, the course is a *foremen's* course, and it is the foremen who are mainly wanted for it. In these cases it will be necessary for the manager or superintendent to miss meetings, but it ought to be arranged so that some representative of the higher management is invariably present. If the higher officials enroll and then never show up, the foremen will naturally feel that the enrollments were a decoy. Moreover, the presence of higher executives adds interest to the meetings. At first the foremen may show some reticence. They are afraid to talk out, but this soon wears away, and lively discussions develop. The fact that the "boss" has discussed a point that a foreman brought up in the conference, or that a foreman gave his idea on a question asked or a subject introduced by the "boss," has a valuable psychological effect on the meetings and on the development of the foremen in the meetings.

The higher executives who want improved foremanship hard enough will be willing to sacrifice some of their time toward that end. In most cases they will find, as in the Canadian plant cited, that the supposed sacrifice will prove to be not a loss but a gain; for in the study and in the group discussions they will find much to help them in the administration of their own jobs, and the foremen will respond to the democratic attitude by an increased self-respect and an increased recognition of their responsibilities as the connecting link between the management and the men.

Environment Is Important

Once the class is organized, it ought not be handicapped by uncomfortable or inadequate facilities. This may seem a trifle, but in several instances groups that started off well have declined and failed because the meetings were held in stuffy, ill-lighted rooms, or at times inconvenient for the men to attend. It is quite important that the handicap of physical inconvenience be absent as much as possible, and that the rooms used for lectures and group meetings be adequate in size.

In the final estimate, it all comes down to the attitude of the management. The management must take the project of foremen training as seriously as it wants the foremen themselves to take it. It must back up its desire for improved foremanship by confidence in the plan it has to offer and by leadership in the direction which it wishes its foremen to take. Such an attitude, rightly followed into practice, will mean the reinforcement of the training in every way possible by the management, the provision of adequate equipment, the fullest indorsement of the training to the foremen, and the participation of representatives of the management in the program.

The result, under such conditions, will be limited only by the ability of those intrusted with the training to build upon the interest and enthusiasm engendered by a favorable start.

Bulletin Discusses Pure Iron Alloys

"Preparation and Properties of Pure Iron Alloys" is the title of scientific paper No. 453 of the bureau of standards, Washington. This paper which will be available soon deals with fundamental principles involved in the manufacture of steel products. To protect life and property it is necessaray that the architect and engineer know the kind of steel which should be specified for each use. To know what composition a steel should have to stand a certain amount of strain or meet the necessary requirements, the effects on the steel of each of its constituents must be known. The general effects of each of these constituents have long been commonly known, but technical difficulties have hindered really thorough studies of the specific and exact effects of each of the elements. Pure iron is difficult to prepare, and it is even more difficult to add a controlled amount of some one constituent of steel to pure iron without some contamination.

In this investigation iron of practically 100 per cent purity was prepared by an electrical method similar to the method of silver plating in which the metal is deposited from a solution by the passage of an electric current. The iron is plated out, leaving the impurities behind. This iron was then melted in a vacuum to

exclude the effects of gases which would be taken up from the air if melted in contact with it. The heating was done electrically and the containing crucibles were made of the most chemically pure magnesium oxide.

Extensive series of alloys were made by remelting this iron in this same manner and adding carbon and manganese. Compositions were varied by small amounts so as to include the entire range of compositions found in ordinary steels. Specimens from these ingots were tested and results compared so as to bring out the effects.

Welds Galvanized Steel Storage Tanks

CONSTANTLY increasing demands for underground gasoline and oil storage tanks have been accompanied by more and more stringent regulations governing their construction and insulation. The result has been to take the manufacture of these tanks out of the hands of individuals and to build up large manufacturing plants devoted exclusively to this line of work. One of the largest manufacturers of gasoline tanks in the country is the Gilbert & Barker Mfg. Co., Springfield, Mass., and in view of this fact, some of the methods of this company may be regarded as standard in tank construction. During recent years riveted and welded tanks have had a close contest for supremacy. In the case of the Gilbert & Barker Co., however, the welded tank has won out; practically all tanks made at their plant being of this contruction.

The material used is open-hearth, soft steel rolled into sheets of 12, 14 and 16 gage and cut into various sizes depending upon the capacity of the tank which is to be made. The sheets, after being cut, are galvanized by the hot process, and are received in carload lots on a spur track at the tank factory. Even though the size of tanks produced at this plant varies greatly, the whole scheme of operation has been worked out carefully to give a continuous flow from the time the raw material enters at one end until the crated tank leaves the shipping room at the other end.

In the manufacture of a cylindrical tank the first step is to run the sheets through rolls which give them the correct circular form. Fig. 3 shows one of the machines used for this purpose. After this the ends of the curved sheet are placed together and the longitudinal seam is welded in a butt joint. This completes one circular segment of a tank. Other similar segments are then welded end to end, which together with the end heads form the complete tank. Underground tanks are usually designed to take a horizontal position and in this case all flanges and longitudinal seams are placed at the top of the tank so that together with pipe joints, they will be above the level of the liquid.

Welding as shown in Fig. 1 is a hand operation. The abutting sheets are fused together at a temperature of 6300 degrees Fahr. with additional metal at the joints being supplied by a wire held by the operator. Oxyhydrogen torches are used in this welding process, and because of the large volume of these gases required in the complete plant, it has been found advisable to install an oxygen generating outfit as part of the plant. This is shown in Fig. 4. Because of the cylindrical form of the tanks in process of construction the handling from one department to another is simply a matter of rolling them along the concrete floors of the plant.

FIG. 4—ALL SEAMS ARE BUTT WELDED WITH OXYHYDROGEN TORCHES AT A TEMPERATURE OF 6300 DEGREES FAHR. FIG. 2—IN THE TESTING DEPARTMENT THE TANKS ARE PLACED UNDER AIR PRESSURE AND ALL SEAMS PAINTED WITH SOAP LATHER TO DETECT LEAKS. FIG. 3—GALVANIZED SHEETS ARE GIVEN THE CIRCULAR FORM REQUIRED FOR TANKS BY PASSING THEM THROUGH BENDING ROLLS. FIG. 4—WHERE THE DEMAND FOR OXYGEN FOR WELDING IS HEAVY, IT HAS BEEN FOUND ECONOMICAL TO GENERATE THIS GAS AT THE PLANT

The welding department is a large open room with oxyhydrogen gas stations scattered at frequent intervals throughout the entire area. After welding the tanks go to the inspection department where they are subjected to an air pressure of aoout 4 pounds per square inch and the gage watched carefully to show up any leak in the system. By painting the joints with soap lather, as shown in Fig. 2, even the most minute leak is detected quickly. From the testing room the tanks are taken to the painting department, and from there to the shipping room.

COAL

Reviews Blast Furnace Practice

Auxiliary Equipment and Method of Operation Are Prime Factors in Economical Production of Pig Iron—Uniformity in All Controllable Factors Is a Requisite to Uniformity of Action Within the Furnace

BY A. K. REESE

UNDER the heading of auxiliary equipment it is not intended to enter into a detailed discussion of the many units comprising the auxiliary equipment of a modern blast furnace. There are, of course, certain units which are essential to the operation of any blast furnace. Where, for the purpose of emphasizing the requirements of modern blast furnace practice, it is necessary to discuss the modern features of these units they will be referred to specifically. There are also certain units which, while not essential to blast furnace operation in general, are essentials from the standpoint of economical operation. These will be discussed in more detail, but only so far as the principles involved in their adoption are concerned.

The auxiliary equipment, or plant required for the operation of a blast furnace, may be divided into four classes: 1. The power plant; 2. the blast heating plant; 3. the raw material supply plant, and 4. the output disposal plant. Equipment falling under one or other of these sections is essential to the operation of every blast furnace. In modern practice, however, there are certain features in the details of the plant required, bearing upon the method and economy of operation, which are essential to the full adoption of that practice.

The term power plant, which is used here in its most comprehensive sense, covers all apparatus for producing and utilizing the power required for sustaining the blast furnace operations. The principals among these are the boiler plant, the blowing engine plant, the electric generating plant, the water pumping plant, and, in some cases, the hydraulic power and compressed air plant. With regard to most of these items, it need only be said that they should be of the most modern, simple, and economical type, with ample reserve of power and capacity, in order to minimize those costly furnace stoppages, which are otherwise likely to occur through mechanical failures, or interference with normal operation through lack of efficiency. In other respects they do not, with the exception of the blowing engines, bear directly upon the principles of modern blast furnace practice. In regard to blowing engine capacity, and in one particular feature to turbo blowers, there is a point which it is important to emphasize. As previously stated, the volume of air required for the normal operation of a full-sized modern blast furnace is from 40,000 to 50,000 cubic feet of air per minute. It is important that this air should be delivered in as continuous a flow, or as free from pulsations, as possible.

Governing Device Necessary

With reciprocating engines, the speed and number of blowing cylinders should be as great as possible, consistent with engine safety and efficiency, and the range of volume delivered as wide as possible with a fair degree of economy. The engines should also be designed to deliver their maximum volume against pressures up to 25 to 30 pounds per square inch with steam pressure or gas of quality at least 20 per cent below the normal, in order to provide for those abnormal conditions to which every blast furnace is liable. As regularity in air volume delivery is an essential of modern blast furnace practice, every engine should be equipped with an efficient governing device.

As above mentioned, the centrifugal or turbo blower is widely used, and is rapidly growing in favor for blast furnace work. Well designed blowers of this type have several advantages over the reciprocating type. They are simpler in design; are lighter in weight per unit of capacity; require less floor space and less massive foundations; are lower in first cost; have fewer moving parts; have no losses through reversal of motion; are lower in cost of maintenance and repairs; require less attention in operation; and are much easier and less costly to lubricate. They give a continuous flow of blast delivery, being entirely free from the pulsations in delivery within their rated capacity.

There is, however, one feature in the turbo blower, as compared with the reciprocating blower, which must be specially provided for to ensure its suitability for modern blast furnace practice. As above stated, regularity or constancy of the volume of free air per minute, required by the furnace operator for the time being, is an essential of that practice. This volume must not materially vary or be affected by the more or less varying resistance, commonly called pressure, on the delivery side of the blower, due to the varying furnace conditions. In reciprocating blowers this requirement offers no difficulty, as regularity of the volume delivered is assured by regularity in engine revolutions, whatever the resistance, within the limits of the capacity of the blower. In the turbo blower, however, the volume delivered varies both with the engine revolutions and the resistance on the delivery side. The turbo blower, therefore, requires for its satisfactory application to modern blast furnace practice a special type of governing or controlling device in order to assure the delivery of a constant volume of blast per minute against the varying resistance offered by the varying furnace conditions. For many years this feature in the turbo blower was a serious drawback to its adoption for blast furnaces, notwithstanding its many other advantages. Its general adoption and growing use in recent years is directly due to this difficulty having been successfully solved through the design and application of an efficient volume regulator.

The blast heating plant consists essentially of the hot-blast stoves and their connections, for receiving cold blast from the blowers and waste gases from the furnace, and for delivering hot blast to the furnace and consumed gases to the atmosphere. Under this heading should be included another installation which is an essential part of modern blast furnace equipment from the standpoint of economy. This is the gas cleaning plant, or rather, a rough gas cleaning plant as distinct from the plant required for the high degree of gas cleaning necessary for use in gas engines. The advantages and economies obtainable by the use of clean gas as

---

This is the second and last part of a paper presented at the meeting of the Iron and Steel institute, York, Eng., Sept. 5-6. The first part appeared on page 989 of the Oct. 12 issue of IRON TRADE REVIEW. The author is a consulting engineer, Cardiff, Wales.

compared with uncleaned gas are many and of considerable importance, far outweighing the cost of installation, operation, and upkeep, etc.

Though this question has already been fully discussed by various writers, a number of these advantages, some of which also apply to the boiler plant, are enumerated as follows:

1. A much higher thermal efficiency of the gas is obtained through more perfect combustion, by better control of air and gas mixture, and the elimination of fume and other heat absorbing solid matter, with the consequent increase in the heat units available for absorption by the stove checker bricks and boiler flues.
2. The saving of the labor constantly required for cleaning stoves and boiler flues.
3. The saving of labor and materials required for repairs to stoves necessitated by the fluxing effect of the solid matter in uncleaned gas on the brickwork.
4. The much longer life of stove linings through the absence of these destructive effects of uncleaned gas.
5. The much greater time service per stove and per boiler through the elimination of lost time for cleaning and repairs.
6. The much greater possible heating surface per unit of stove volume through the use of smaller checker openings, and the higher efficiency thus obtainable.
7. The greater regularity in blast temperatures obtainable through the maintenance of a higher average stove efficiency.
8. The hot blast being practically free from abrasive dust there is an absence of its cutting action upon the linings of the hot blast connections and of the iron and steel fittings where blast leaks are liable to occur.

The large volumes of blast used in modern blast furnace practice naturally necessitate stoves of much greater heating surface than is required in the older practice. The modern hot blast stove, therefore, is constructed with a heating surface of 70,000 to 85,000 square feet; checker openings are from 3 to 4 inches in diameter or square, inclosed in a shell 20 to 22 feet in diameter and from 95 to 110 feet in height. There are usually four stoves per furnace, though in some cases seven stoves are provided for two furnaces, one being arranged so that it may be used on either furnace. This is open to the objection that the two furnaces may need the extra stove at the same time to the probable disadvantage of one. Each furnace should have its own complete equipment when both are in operation. The stove shells and their fittings and connections must be of greater strength than in the older constructions to withstand the higher pressures they are subject to, and the latter of ample area to accommodate freely the large volume of air and gas passing through them.

A small but important feature in modern blast furnace equipment is the blast temperature regulating pipe, which consists of a connection between the cold and hot blast mains. This connection admits cold blast direct into the hot blast main, enabling the regulation of the blast temperature, usually downward, when required. The cold blast connection may be made at any convenient point in the cold blast main, but the connection into the hot blast main should be at the furthest possible point from the furnace to intercept the blast from the nearest stove, in order that the cold and hot blast may have as great as possible time to thoroughly mix. Otherwise there is danger of the cold and hot blast not thoroughly mixed entering the bustle pipe, or circular main, from which the tuyere connections are fed, when some of the tuyeres will receive blast of higher temperature than others with consequent uneven working of the furnace.

Materials Handled Mechanically

While economy in the cost of handling the raw materials for supplying the furnace has grown to be a first consideration in the design of the plant under this heading, particularly in recent years of high labor costs, the original incentive to the adoption of mechanical handling was rather one of necessity. The rapid increase in blast furnace outputs necessitated such large quantities of materials that they could not be handled efficiently by the older methods of manual labor. It was therefore necessary to install mechanical charging devices. Labor displacement rather than necessary labor saving was the primary incentive, though the latter undoubtedly was recognized as an important consideration.

An important labor saving feature is that the raw materials shall be delivered to the works, when by rail, in self-discharging hopper cars of as large capacity as possible, with one-man opening and shutting doors; when by sea direct from the ship, by means of large capacity grabs to a transfer traveling bridge which delivers the material so received direct to the furnace bins, to the stockyard situated adjacent to the bins and directly under the transfer bridge, or into railway cars. The bins usually consist of a double row of slanting bottomed inclosures, constructed of steel or concrete, varying in number according to varieties of ores used, and running usually in a direction perpendicular to the length of the transfer bridge, the inclination of the bottom being toward the center line between the two rows of bins and at an angle somewhat greater than the angle of repose of the materials. The bins are each of moderate capacity, but in total capacity usually sufficient to supply the furnace for from 48 to 72 hours only, as by means of the transfer bridge ample facilities are at hand to keep them filled from the stock piles if necessary. Each row of bins forms the support for a standard gage railway track for conveying to and discharging into the various bins such materials as are received in railway cars. A transfer car also runs on this track, or on a separate track supported by the bins, for distributing the materials delivered by the transfer bridge from the stock piles or direct from the ships. The railway cars are elevated to the roads over the bins, either by an electric lift, or over an incline where there is sufficient room, the cars descending to the ground level either over the same incline or a similar one at the other end or by means of a car drop.

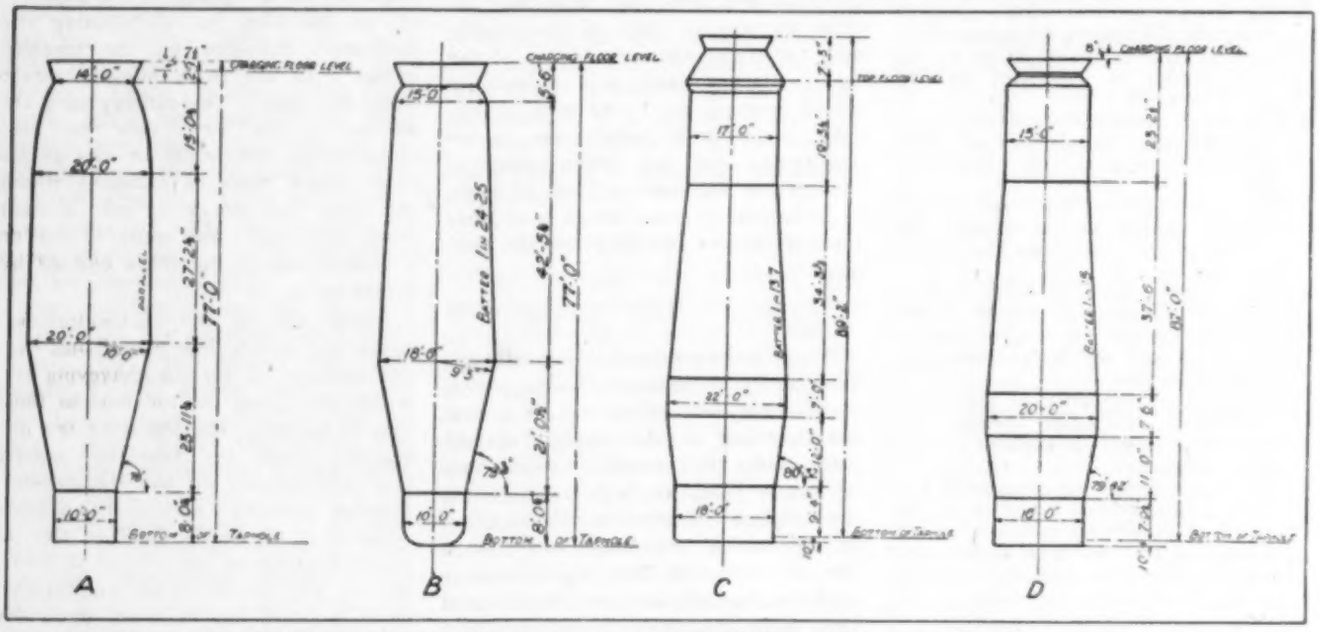
Below and on the center line between the double row of bins on electric transfer car for conveying the materials runs from the bins to the hoist skip or bucket. The materials are discharged from the bins by gravity into a receptacle on the transfer car, through suitably controlled openings situated at the lower limit of the inclined bottoms of the bins. The transfer car also carries as an integral part of it, a weighing machine, upon the beams of which rests the receptacle for receiving the materials from the bins, so that any predetermined weight of material may be discharged into the transfer car receptacle from any particular bin. The whole of the operations in connection with the transfer car are carried out by the driver of the car, whose position is such that he has under his control and observation the discharge of the materials from the bins, the weighing of the materials, and the driving of the car. The capacity of the transfer car is such that it can deliver in each trip a quantity equal to the maximum load of the hoisting skip or bucket.

Various means are in use for assuring that the materials are well distributed as they discharge into the transfer car receptacle. From this receptacle the materials are discharged through a suitably controlled door in the bottom into the hoist receptacle, or, as in some arrangements, the transfer car receptacle is hoisted direct from

its seat on the car to the top of the furnace. Several methods of hoisting the materials to the top of the furnaces are in use in modern blast furnace equipment, which may be divided into two classes; the skip inclined hoist and the tub or bucket hoist, the latter consisting of either an inclined bucket hoist, or a vertical bucket hoist with a horizontal transfer bridge at the top. As usual where several methods are in use for doing the same thing, engineers and operators differ as to which provides the greatest number of desirable features for its purpose. That purpose is obviously to deliver the solid raw materials required in the production of pig iron to the top of the furnace, and to distribute them as uniformly as possible on and around the furnace charging bell. This is a feature of the greatest importance, as has been shown in the discussion of the question of distribution under the section on preparation of materials.

The principal output from a blast furnace is pig or molten iron, the others being slag and gas. With modern blast furnace equipment the pig, or casting bed has ceased to exist as an essential part of the furnace equipment, the whole of the output being run into ladle cars of varying capacity, from the simple open top type of 30 or more tons to the large inclosed type of 100 or more tons capacity, though in some cases even the use of hot metal ladle cars is eliminated, as will be described later in connection with the casting machine. When the molten metal is taken to the steelworks receiver or mixer, that is an end of it as far as the blast furnace is concerned, excepting when the quality is not satisfactory to the steelworks manager. When all or any portion of the output is required in the form of pigs, the molten metal is run into ladle cars for conveyance to a casting machine usually located at some point away from the furnace and convenient to railway connections. In some more recent arrangements the casting machine is located adjacent to the furnace, the molten metal being run direct into a receiver from which it is teemed into the casting machine feeding troughs, thus eliminating the necessity for hot metal ladle cars, except for such molten metal as is required for steelmaking.

Though several types of pig casting machines have been designed, the original or Uhling design, with various modifications and improvements for handling the molten and cold metal, is the type usually installed at present. This machine consists of an endless chain of cast iron molds of about 100 pounds capacity each, and of a shape to allow a free discharge of the cold metal. The molds are key bolted to a flexible frame carried on small flanged wheels which run on an inclined way rising from the pouring end. The molten metal is poured from the ladles which are tilted by a power device into a shallow basin from which it runs through feeding troughs into the molds as they rise slowly from their return journey and pass under the discharge end of the troughs. To prevent the molten metal burning or sticking, the molds are coated with a solution of limewater, which is sprayed upon them as they return to the pouring end upside down under the machine, the limewater being blown upward by air jets in the lime tank. Owing to the heat of the molds they quickly dry in readiness for the molten metal before they reach the feeding troughs. At the upper end of the train of molds as they turn over to begin their return journey, the metal, which by this time has solidified, freely falls from the molds on to a chute from which it discharges either direct into steelbodied cars where it is water sprayed for cooling, or on to an inclined traveling endless plate conveyor which passes with its burden of hot pigs through a water filled tank of a length sufficient to cool the pigs below the ignition point of wood. At the upper end of the conveyor as it turns for the return journey the cold pigs slide off into a chute and are discharged into railway cars.



SKETCHES SHOWING PRINCIPAL LINES OF BLAST FURNACES. *A* AND *B* REPRESENT STACKS OF PREMODERN TYPES AND *C* AND *D* REPRESENT STACKS OF MODERN TYPES

Machines are built single strand or multiple strand according to the capacity required, each strand consisting of a single chain of molds having a capacity of roughly 500 tons per 24 hours. While the structural parts of these machines formerly were built entirely of steel they are now constructed of iron and concrete, owing to its more lasting qualities and lower cost. In addition to the necessary facilities which it provides for casting the large outputs of the modern blast furnace, the pig casting machine has much simplified the handling of molten pig iron by eliminating the many objectionable features of the older method of casting in sand beds, and breaking by hand or by hydraulic or electrical pig breaking machines, be-

sides effecting considerable economy of labor and saving in waste.

The disadvantages of sandbed casting and the advantages of the machine method of handling molten pig iron are enumerated below:

Disadvantages of the sand casting method:

1. Difficult and high priced labor required.
2. Large quantities of clean sand required.
3. Imperfect results, core jumps, plated beds, irregular breaking, and irregularity in sizes of pigs and sows.
4. Heavy waste in runner scrap.
5. Slower melting of sand covered pigs, and cost of melting the sand on the pigs, in the steel furnace.
6. Deleterious effects of sand covered iron in basic steel furnaces.

Advantages of the pig casting machine method:

1. Immediate removal of molten metal from the immediate vicinity of the blast furnace. This, of course, does not apply where the metal is run direct into a receiver adjacent to the furnace, as above described; but the author believes this arrangement has not yet been widely adopted, and is of opinion that notwithstanding the slightly extra cost of ladle cars, it is better to remove the molten metal to a safer distance, in view of the disturbances which sometimes occur in the immediate vicinity of blast furnaces through breakouts, explosions, etc.
2. Practically no manual labor required.
3. Sand free iron.
4. Uniform size of pigs of iron, and no heavy sow pieces.
5. Facilities for disposal of the output always in readiness.
6. Great reduction in runner scrap produced when casting.
7. Saving in labor charges.
8. No core jumps or plated beds, unsalable iron requiring extra labor for breaking and handling.
9. A difficult and trying class of labor is dispensed with.
10. Where week-end iron only is cast, the difficulty of finding special labor for these days only is eliminated.

A discussion of this heading would not be complete without reference to the slag and gas, both of which form part of the furnace output. While there are no special methods of slag disposal which may properly be said to apply particularly to modern blast furnace practice, it may not be amiss to refer to some of the methods in use at modern plants. The most usual method of course is the use of large capacity, self discharging, mechanically operated slag ladle cars, in which the slag is conveyed to some point more or less distant to get it out of the way.

Processes Recover Slag

However, where recovery of the slag is desired for special commercial purposes, special methods are used, such as blowing steam through the molten slag for the production of slag wool; running the molten slag into tanks of water for granulating for cement making or other uses; running into special receptacles and cooled in layers for producing a solid product for concrete making, etc. As stated, these processes are for special purposes, and do not apply generally.

With regard to the gas there are a few points also which may be mentioned. In view of the large volumes of gas produced in modern furnaces with large outputs, it is of great importance that ample areas shall be provided in the gas out-takes at the furnace top, not only to provide for the large volume of gas to be discharged through them, but also to reduce its velocity to a minimum, in order to lessen as much as possible the tendency for the smaller particles of solid materials to be mechanically carried out with the gas. For this purpose it is usual to provide four equally distant outlets of the largest size consistent with structural safety.

In some designs baffles are placed in the elbow of the uptakes in such a position that they will intercept these heavier pieces, thus avoiding the necessity for carrying the uptakes so high. A further reason for the multiple equidistant outlets is to prevent any tendency of the gases in the upper portion of the furnace to channel toward one side, as they tend to do in older furnaces with one outlet, thus reducing the active area in the upper reducing zone of the furnace.

In the foregoing pages the author has endeavored to define in some detail those factors which enter into, and make possible, modern blast furnace practice. They are the elements out of the adoption of which that practice has developed. He has therefore designated them "The Bases of Modern Blast Furnace Practice."

Certain operative features necessarily have been referred to in connection with the discussion of these factors; but so many of the details of operation, or management of a blast furnace, are based on practical knowledge, acquired only by years of experience and common sense, that any detailed discussion of them is not possible in a paper of this nature.

It would not be complete, however, without some reference to an essential difference in the method of operation by which the improvements in results, made possible by the adoption of these factors, are obtained, and the method of operation still prevalent in many localities where modern practice has not been adopted. In modern practice the nearest possible approach to uniformity in all controllable factors is a first principle in order to obtain the nearest possible approach to uniformity of action within the furnace. Reference has already been made to the importance of this question of uniformity in various connections, including uniformity or regularity of blast volume, irrespective of furnace pressure or resistance. In the older practice just referred to as still prevalent in many localities, the volume of blast is varied with the furnace resistance, that is, the varying conditions within the furnace are permitted to cause lack of uniformity or irregularity in the volume of blast delivered to the furnace. This method being contrary to the principle of uniformity of all controllable factors is totally inapplicable to modern practice.

As the principle involved in the comparison of these two methods of operation were outlined in some detail in the author's evidence before the iron and steel industries committee, he will not state them here. Suffice it to say that blowing by constant volume irrespective of furnace resistance is the method of operation essentially employed in modern blast furnace practice.

The actual volume of blast per minute, the number, size, and length of projection of the tuyeres inside the crucible walls, the weight of coke per round of charge, the rotation of coke, ore, and flux in the charge, the degree of bosh wall cooling, etc., are all operating conditions determinable, for any particular furnace and set of materials, within certain limits by experience only.

Rivers Carry More Steel

Shipments of iron and steel products on the rivers of the Pittsburgh district in October totaled 48,526 tons, an increase of 21,018 tons in comparison with September, according to the monthly report of the United States engineer at Pittsburgh. The tonnages moved on the various rivers by

months since the statistics for iron and steel have been separately stated are as follows:

Month	Allegheny	Monongahela	Ohio	Total
October	4420	19,380	24,726	48,526
September		21,970	6,538	27,508
August		23,545	16,977	40,522
July		25,633	9,880	35,513
June		33,675	16,600	50,275
May		28,112	16,765	44,877

Import Values Show Loss Over Full Year

The 10,718 tons of ferromanganese imported into the United States in September had an average selling price of $56.46 per ton, while the 804 tons imported in September, 1921, came in at an average of $69.85 per ton, department of commerce records show. Ferrosilicon likewise came in cheaper in September, the average for this September being $54.11, contrasted with $57.38 a year ago.

Pig iron imports in September averaged $20.91 per ton while in September, 1921, the average was $23.85. Iron ore, on the other hand, showed a marked increase in price, the average for this September being $5.34 per ton and for last September $4.29.

A jump of almost 50 per cent is recorded by the scrap classification, which includes scrap tin plate. The average for September this year was $15.51 and for last September $10.70. Bar iron came in in September at an average of $65.15 per ton, compared with $76.97 a year ago. Imports of rails were low both in price and in quantity, this September presenting an average of $17.56 and last September $30.10.

Because of the Fordney-McCumber tariff act becoming effective on Sept. 22, the above figures include imports through Sept. 21 only. The prices are all the average foreign selling price, usually including freight to the port of export, and in all cases taking into consideration the exchange rates.

The following table shows the import tonnages and average values per ton for September this year and last:

	September, 1922 Gross tons	September, 1922 Average per ton	September, 1921 Gross tons	September, 1921 Average per ton
Iron ore	127,838	$ 5.34	4954	$ 4.29
Pig iron	46,839	20.91	2499	23.85
Ferromanganese	10,718	56.46	804	69.85
Ferrosilicon	3,615	54.11	633	57.38
Scrap	12,224	15.51	5549	10.70
Bar iron	371	65.15	190	76.97
Rails	705	17.56	2850	30.10

Creating a Broader Market for Coke

BY W. G. RICH

COKE is by no means a new fuel, since records exist establishing its manufacture 2000 years ago by the Chinese. About the year 1600, Germany secured patents for the desulphurizing of coal, and later experiments were conducted in smelting iron with coke. In 1856 the first coke ovens were built in France for recovery of by-products. The first by-product coke oven plant to be built in this country was installed in 1893 in Syracuse, N. Y., and during the first year of operation produced approximately 13,000 tons of coke. At the present time over 11,000 by-product coke ovens are in existence with an annual production of over 44,000,000 tons of coke. This is exclusive of the so-called "retort" coke which is produced by the gas light companies. In the merchandising of coke, whether it be coke oven coke or retort coke, the fundamental principle is advertising, with the term used in a broad sense to include advertising or propaganda within the organization of the producer, as well as publicity without.

Interior advertising, or promoting confidence in a product on the part of the employes and officials of the producing company, is an important consideration and one which often is overlooked. Coke produced by gas companies has so long been considered a waste product that often it is difficult for officials to realize its merchandising value. Coke should be considered a real manufactured commodity and not merely a material which must be disposed of in some way. Gas companies should acquire the habit of associating the word "coke" with the name of the company, as this makes it possible to advertise the product advantageously. Interior advertising should start at the coke ovens. Foremen and superintendents, and all others connected with the industry should be impressed with the importance of the fuel which is being produced. An excellent scheme is to have the coke plant accessible for inspection and then extend an invitation to the public to visit. This is one of the best ways of getting the public interested in coke as a fuel. One of the first results after starting to advertise coke within a plant itself usually is an improvement in the quality of the coke. Poor quality and badly prepared coke are the fundamental reasons for the average gas company having difficulty in disposing of its stock. The quality of gas manufactured may be watched constantly while the coke may be ignored. The chief object in this connection is to drive home the fact that coke stands parallel with gas as a product of the plant. In this connection the commonly used word "by-product" seems to be a misnomer, as it gives the wrong impression.

Differential Required on Coke

Coke should be treated as one of the main products and not as a by-product, and this can be done without interfering in any way with the quality of gas. In selling coke to the foundry trade the chief competition is found in other brands of coke, but when selling to the commercial and domestic trade the fuel comes in competition with hard coal.

Strong advertising is one of the essential features in promoting sales of coke. Advertise the product not as by-product coke, but as coke, in the same manner that ammonia or tar is now advertised. In the manufacture of coke some plants produce an excessive amount of small coke similar to that of chestnut size anthracite coal, and it is their custom to distribute this in bags, which is not as good a scheme as selling in bulk. In promoting a widespread wholesale market for coke, it is necessary to keep the dealers enthusiastic about your product, and the best way to do this is through an intelligent advertising campaign. Often the expense of such a campaign can be divided between the dealers and the producing company.

Merchandising of foundry coke, to a large extent, requires personal effort and solicitation among the foundries. In addition, a medium sized display advertisement should be used frequently in the trade papers. It is necessary for the name of the manufacturer of foundry coke to be kept constantly before the foundry trade owing to strong competitive conditions. Foundries prefer a large blocky coke having a firm cell structure since the large pieces of solid coke hold up the burden of the iron in the cupola, while small size coke would crumple and also would retard the passage of air up through the coke. Foundries require a fuel high in carbon and low in ash. Good foundry coke also must be low in sulphur, high sulphur coke having a tendency to make castings brittle. Foundry coke should not exceed 10 per cent ash or 1 per cent sulphur. The average analysis of an ideal foundry coke is as follows:

	Per cent
Moisture	75.00- 2.00
Volatile matter	1.25- 1.50
Fixed carbon	90.50-87.00
Ash	7.50- 9.50
Sulphur	0.60- 0.85

From a paper presented at the Atlantic City, N. J., convention of the American Gas association, Oct. 23-27. The author is manager of the coke sales department, Providence Gas Co., Providence, R. I.

Grinder Finishes Machine Ways

Flat Bearing Surfaces on Machine Tool Beds Are Generated Accurately on a Special Heavy-Duty Grinding Machine—This Operation Makes Scraping Unnecessary—Details of Method Are Described

BY A. R. LUDEWIGS

IN THE manufacture of machine tools, scraping is relied upon extensively for fitting sliding surfaces accurately, this practice having been handed down through generations of skilled craftsmen. After the war, however, German engineers were faced with the problem of obtaining satisfactory manufacturing results at a minimum expense and particular attention has been given in that country to the elimination of hand labor. This situation has given the German grinding industry a decided impetus, and German mechanical engineers are devoting considerable attention to abrasive engineering.

A novel departure in machine tool manufacturing embodies the use of a special heavy-duty grinding machine for finishing both straight and angular bearing surfaces so that scraping is not necessary in the assembling operation. Such a machine is shown in Fig. 2. This tool is built by the Schmirgelwerk Dr. Rudolf Schonherr, Chemnitz-Furth, Germany, and was designed by Richard Uhlig, the company's chief engineer.

Fig. 1 illustrates cross-sections of machine tool sliding surfaces finished on this machine, the shaded portions representing the ground surfaces. It is claimed that the machine finishes these surfaces with a high degree of accuracy and also that the use of expensive master plates heretofore employed in scraping operations is eliminated.

The machine shown in Fig. 2 has a substantial box-type base, *A*, that supports the sliding table, *B*. A round column, *C*, carries the head, *D*, which has two arms, *E* and *F*. The head, *D*, is raised and lowered by a hand wheel while it also can be swung around the column to bring either of the arms, *E* and *F*, into the most convenient position for performing specific grinding operations. The arm, *E*, is equipped with a large cylinder wheel that covers the entire working surface of the table. With the wheel in position over the work, grinding is accomplished by the longitudinal movement of the table. Surfaces generated in this manner are said to be flat and true.

The arm, *F*, carries a motor, *G*, mounted on a saddle which, in turn, is located on a short cross-rail. By means of a pinion and gear movement, the cross-rail can be set at any angle. An angular setting for finishing a V-way is shown in Fig. 3, the work in this case being a lathe bed. As all the various plane, vertical and angular surfaces are finished by grinding at one setting of the work, it is obvious that they will be true within exceedingly close limits. The lathe bed is 10 feet long, 32 inches wide with V and plain surfaces and a seat for a gear rack at the center. This surface also is finished by grinding so that the rack can be located accurately to insure quiet running after the machine is assembled.

The operation shown in Fig. 4 consists of finishing bearing surfaces on a boring and milling-machine frame part. The work is strapped to the table and is aligned approximately true after which the various bearing surfaces are finished by grinding. This illustration shows how a V-shape cut wheel is used for finishing simultaneously the under side of a bearing surface and the top of a flat surface. To finish the other double-V surface at the left, the grinding head is set at an angle.

Another interesting grinding operation is shown in Fig. 5. The part in place on the grinding machine table is a lathe bed. In the grinding operation two flat and two vertical surfaces are finished at one setting. As the illustration shows, the wheel spindle is set in a horizontal position for finishing one side of the work. A cup wheel is used, which is notched to insure free grinding.

In finishing such parts as the under surfaces or bearing slides of head and footstocks for lathes, the two members are located on the grinding machine table at one setting and if the work is located from the spindle bearings, it is obvious that the flat bearing surfaces and the spindle axes will be parallel. It is claimed that for finishing machine-tool bearing surfaces by grinding, extreme accuracy is assured by using wheels in the correct

The author is a consulting engineer associated with Schmirgelwerk Dr. Rudolf Schonherr, Chemnitz-Furth, Germany, manufacturer of machine tools.

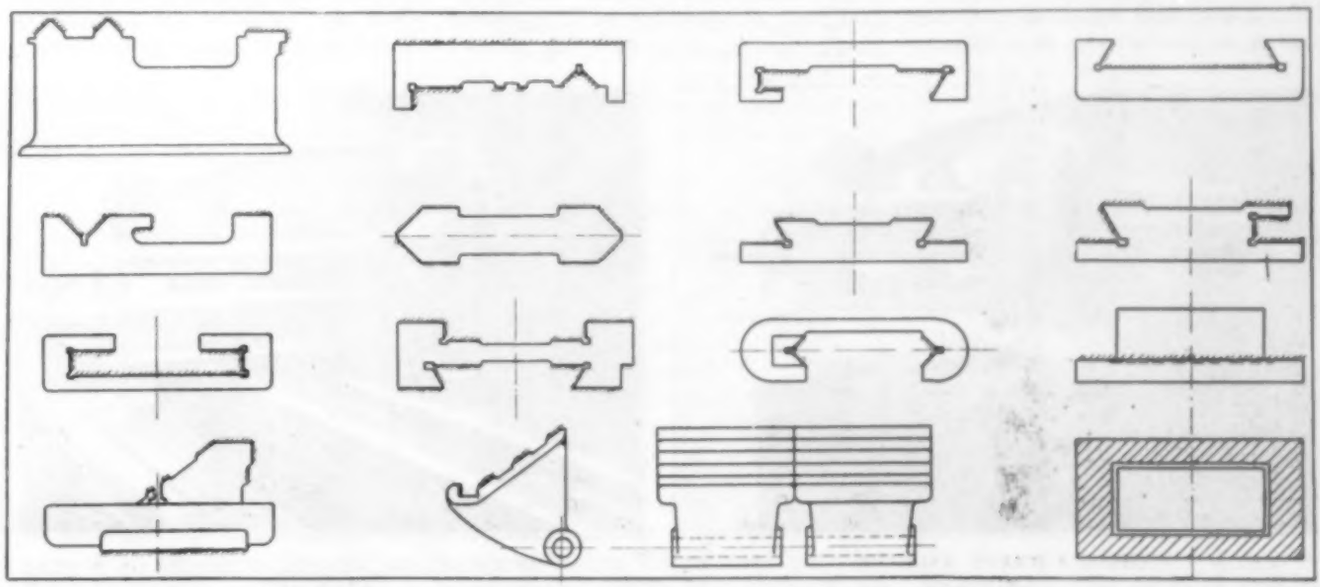


FIG. 1—CROSS-SECTIONS OF VARIOUS MACHINE TOOL PARTS WITH THE GROUND SURFACES INDICATED BY SHADING

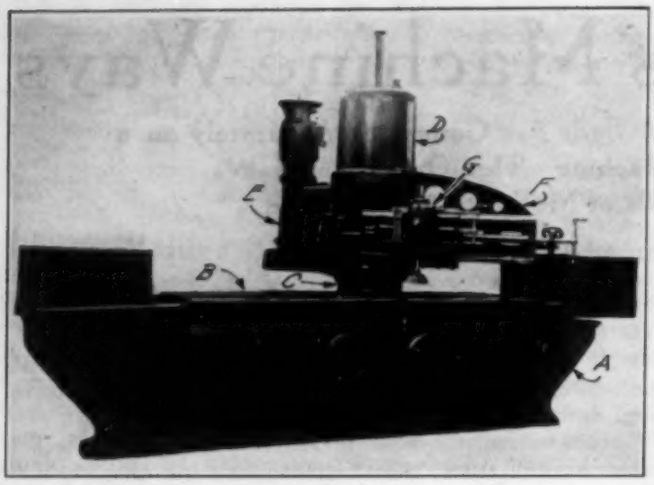


FIG. 2—GRINDING MACHINE FOR FINISHING FLAT AND ANGULAR SURFACES

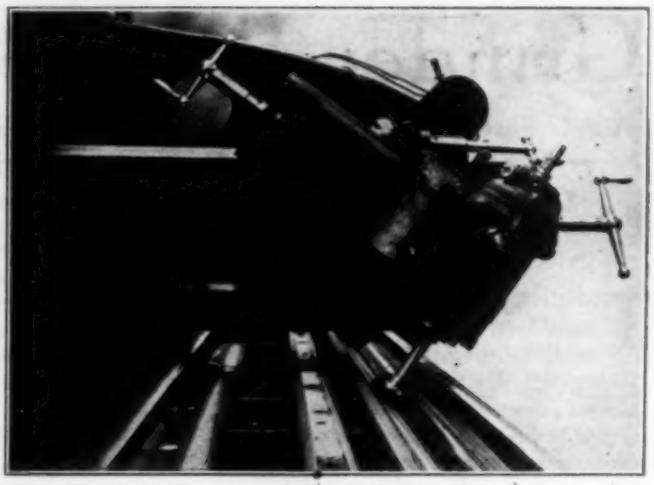


FIG. 3—THE WHEEL HEAD IS SET AT AN ANGLE FOR GRINDING A V-WAY

abrasives, grits and grades. Also it is claimed that the grinding process dispenses with the use of a large number of surface plates which in time are subject to wear, thus making the accuracy of the surfaces tested with them a question of conjecture.

Report Progress of Gage Steel Investigation

A program for laboratory work to be conducted at the bureau of standards, Washington in connection with the gage steel investigation, has been prepared. Already some of the preliminary work has been started. The first laboratory work undertaken has been to determine the reliability of the Amsler wear test machine. This work is being conducted by Mr. Freeman and assistants of the metallurgical division.

Test disks for this machine of SAE 1020 steel case hardened and SAE 1090 steel hardened were made up by Pratt & Whitney Co., Hartford, Conn. The case hardened disks flaked in the machine and were consequently not suitable for determining its performance. It is difficult to harden carbon tool steel uniformly. An oil hardening steel was made up into disks, hardened and used for preliminary tests of the machine. Difficulty was encountered in aligning the machine but this fault has been corrected. However, sufficient data are not yet available to report.

As the progress of the wear tests has been rather slow arrangements have been made with Dr. J. A. Mathews, of the Crucible Steel Co., New York, to get a supply of 1.10 per cent carbon, 1.40 per cent chromium steel for hardening experiments and wear tests and of 0.45 per cent carbon steel for testing the wear of hard disks against soft. As the chromium bearing steel is at present the most universally used gage steel, it is planned to make the most elaborate tests on it.

While waiting the receipt of appropriate steels for the study of hardening problems, some quenching experiments have been made to determine the characteristic curves, cooling power, and reproducibility of the common quenching media. This was accomplished by finding calorimetrically the average temperature of a standard nickel cylinder after different times of immersion in the quenching bath. Cooling curves were thus obtained for quenching in water at 30 degrees Cent. with and without motion of the cylinder, for quenching in oil at 30 degrees Cent. without motion and with slow and fast motion of the cylinder, for quenching in oil at 10, 100 and 200 degrees Cent. without motion of the cylinder, and for cooling in still air. The problems in heat treatment are being investigated by H. Scott assisted by S. S. Kingsbury of the metallurgical division.

H. J. French has varied the heat treatment of several steels in the form of 4-inch cylinders similar to those recommended by the committee with the principal object of determining the effect of rate of heating on the dimensional changes. Some of these cylinders showing large dimensional changes on hardening are being measured for time changes. The length measurements are being made under the immediate direction of Mr. Miller of the gage section. This section has also prepared an attachment to the millionth comparator to take four plus or minus 0.003-inch blocks for measuring the changes on hardening and with time. The attachment includes an oil bath in which the specimens are partially immersed to secure temperature uniformity.

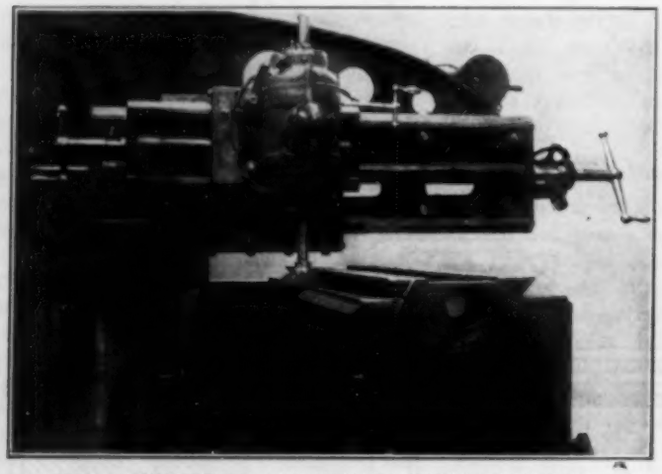


FIG. 4—FINISHING A HEAVY MACHINE TOOL PART BY GRINDING

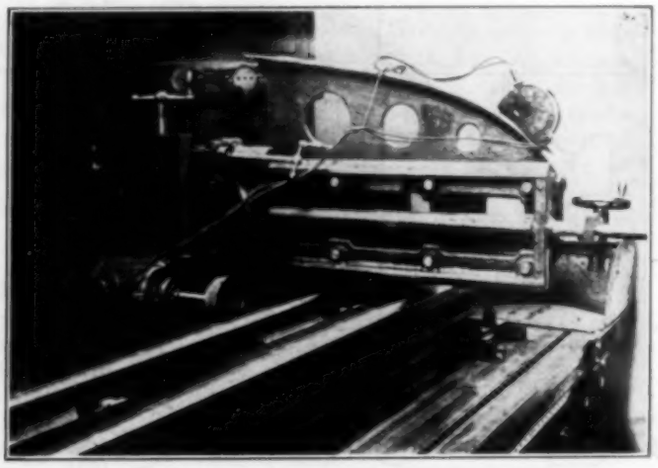


FIG. 5—GRINDING THE BEARING SURFACES ON A FLAT LATHE BED

Urge Small Tool Standardization

Success of Machine Tools May Be Limited by Necessity of Using Short Lived and Costly Cutting Tools—Standards Will Increase the Efficiency and Reduce Overhead—Recommendations Are Made

BY CARL J. OXFORD

MACHINE and small tools are so related, and interdependent on each other that their respective developments logically should go together. Powerful and rapidly operating machine tools may be designed and built; but their success is largely nullified if they require cutting tools of prohibitive cost and of short life. Conversely, small tools may be developed, which with the proper machine tools will produce satisfactory results, but which again with unsuitable machines are complete failures.

Reduction of expenses has become the watchward. Particularly is this true of those expenses which may be classified as production costs. Facing keenly competitive markets, it becomes necessary to cut the cost of production if the manufacturer is to show a balance on the right side of the ledger.

There seems to be but a scant likelihood that either raw material or labor costs will retract to a lower level in the near future. In fact, we have recently seen slight increases in both. The lowering of production costs must therefore be accomplished through improvement in methods, and through increased productivity and efficiency of tools and equipment as compared with first costs.

It is the primary purpose of this paper to point out how greatly the first cost of small tools can be lowered, without sacrificing their efficiency, by the adoption of standards that will permit manufacturers of tools to produce on a quantity basis.

Small Tools Classified

Twist drills, reamers, and milling cutters all are classed as small tools and only these three types will be considered. Usually the manufacturer classifies them as being either standard or special.

Standard tools are those sizes and designs which are regularly cataloged and carried in stock by the larger manufacturers, while special tools are those made up to the customers' specifications.

There exists, at present, a fair uniformity of general dimensions in the tools cataloged as standard by the various makers. This is a step in the right direction; but the belief is expressed here that this uniformity could be carried more into detail, and that the number of standard items listed could be cut almost in two without any serious handicap to the metalworking industries in general.

It is difficult to realize, by those not actively engaged in the small-tool business, what a wide variety of style and sizes are cataloged as standard tools. An examination of several tool-manufacturers' catalogs shows the following average number of items: Twist drills, 3400 items; reamers, 2200 items; milling cutters, 4500 items.

Roughly this makes a total of 10,000 items. Certainly this ought to be sufficient variety to take care of every requirement. That such is not the case, however, is illustrated by the fact that small tool manufacturers annually are making thousands of items of tools not listed in their catalogs.

It is conceded that there are numerous instances where special tools are necessary; but the statement is made advisedly that in many shops from 40 to 60 per cent of the work now performed with special tools could be equally well performed with standard tools, and at a much lower tool cost. To accomplish this it would be necessary, however, to educate the designers of both the manufactured article itself, and of the various holding and locating fixtures, to the importance of adapting their designs to the most economical uses of tools.

Instances are numerous where no end of troubles are encountered in machining because the designers have paid more attention to the technical side of design than to the practicability of performing the various machine operations specified.

In the production of many manufactured articles the cost of perishable cutting tools, as drills, reamers and milling cutters, represents a large percentage of the total productive cost. As a consequence the question of efficient and long-lived tools has come in for considerable attention. The present tendency, however, seems to be toward the use of special tools where an increased production is desired, or where trouble is encountered.

This is believed to be unnecessary in many cases. If a little time and effort is expended in adapting the conditions, as surface speeds, chip thickness and holding devices, it is often found that equally good, or better results can be produced with standard tools than with special tools, although the latter must be obtained at a higher price.

In addition to the higher price of special tools it must be remembered that these are only made up in quantities as specified by the user. Hence the source of supply is restricted, and deliveries are subject to delays. Standard tools, however, can be purchased on the open market and can usually be delivered from the manufacturers' stock.

Relative Costs Compared

Standard tools which are carried in stock by both manufacturers and dealers can be made up in fairly large quantities. Usually from about 500 or 10,000 or 20,000 of each size and type can be put through the factory at one time. This means that many of the benefits accruing from quantity production are realized.

Little time is lost on setting up the machines, operators become more efficient on repetition operations, and in many instances it is possible to utilize multiple equipment and other time-saving devices.

The nonproductive overhead, incidental to every order, also is spread over a number of pieces, so that the amount chargeable against each piece is small. These conditions combined result in a low unit cost.

Compare this with the cost of producing special tools. These are as a rule ordered in small quantities ranging from one to 10 or 20 pieces. Highly skilled all-around machine operators must be employed for this class of work. There is just as much time lost in setting up each of the various machines for one piece as for 1000 or 10,000. There is no opportunity of using multiple equipment on such small numbers of pieces, nor do the machine operators acquire any increased efficiency from repetitions on this class of work.

Nonproductive overhead expenses are nearly as high for one or two pieces as for several thousand. The difference is that in one case these expenses must be absorbed by one or two pieces, while in the other case they can be distributed over a number. It is obvious how this will affect the respective unit costs, and eventually the price at which tools sell.

From a paper presented at the regional meeting of the American Society of Mechanical Engineers, Springfield, Mass., Sept. 25-27. The author is chief engineer, National Twist Drill & Tool Co., Detroit.

Concrete examples of comparative costs perhaps will illustrate the point more forcibly. Let us compare the two twist drills. Both are 19/32 inches in diameter and of identically the same design throughout except that drill *A* is of standard length or 8½ inches while drill *B* is 2⅜ inches longer, or 10⅞ inches. Five hundred of the drills *A* were made at one time, this being a standard size. The drills *B*, being special, could be made only in quantity as specified by the customer, in this case six.

The direct labor cost of *A* proved to be 38 per cent of the corresponding cost of *B*. Adding the nonproductive overhead, chargeable against the respective orders of which these drills were a part, the total cost of the standard drill *A* was found to be 21 per cent of that of the special drill *B*. Representing this in another way, we may say that the increase in length of *B* over *A* was 28 per cent, while the increase in cost was 480 per cent.

Similarly, two milling cutters as *C* and *D* may be compared. The special cutter *C* is slightly smaller than the standard cutter *D*. Yet, owing to the quantities manufactured in each case, the total cost of the cutter *D* was found to be 270 per cent higher than the corresponding cost of *C*.

Necessarily the cost of producing must be reflected in the cost to the consumer. Pursuing this line of thought, it becomes evident that the high cost of special tools eventually is levied against the manufactured articles on which the tools are used, and in turn is passed on to the purchaser of these articles.

If a certain operation requires a special milling cutter costing $30 and that the life of this cutter is 4800 pieces. If this same operation is adapted to the use of a standard milling cutter of approximately the same dimension a considerable saving will be effected. This latter cutter can probably be bought for about $18.

The total cost for one operation is then reduced from $6.25 to $3.75 per 1000 pieces. With a number of machine operations on which such savings may be effected, it is easily conceivable that the results may mean the difference between a possible business loss and a profit at the end of the year.

Eliminating Special Tools

It has already been stated that the total elimination of special tools is impracticable, for there will always be conditions now and then where a standard tool cannot be used; but the number of special tools used in the average manufacturing plant, can be reduced. Engineers and designers responsible for the design of manufactured product and the jigs and fixtures, must realize the economic advantage of standard over special tools. Especially is this true where production of large quantities of duplicate parts are involved.

A jig or fixture is a comparatively permanent article, while cutting tools are in many cases short-lived. Therefore a small additional expenditure, in order to adapt such jig or fixture to the use of standard tools eventually becomes a profitable investment.

Numerous cases can be mentioned where expedients as the shortening of a jig bushing or the reduction in height of some projection on a milling fixture will mean from 20 to 50 per cent reduction in tool costs for that particular operation, inasmuch as it will permit the use of standard tools.

In the manufacturing of automotive parts there comes to mind, several instances where the factory, in order to get out the required production, was compelled to ask the engineering department to alter its designs sufficiently so practical and economical cutting tools could be used. Some engineers, either through ignorance or failure to attach sufficient importance to small tools requirements, are wasting money that should be used either to reduce the cost of manufacture or to pay a profit on the invested capital.

Technical schools and colleges would render a real service to the metal-working industries, if they were to include in their machine shop curriculum at least a limited amount of instruction along these lines.

Efficiency Not Highest

It may be properly said that some of the tools now embodied in the manufacturer's standard list do not represent the highest degree of efficiency, and that there are certain other tools, now regarded as special, which will give better results. This is a sound and logical development of the small tool industry, which should be encouraged through the elimination from the standard tool list of obsolete styles and designs, and the substitution of tools, developed through experience and research, that have proved efficient under all conditions.

For instance, the matter of numbers of teeth in milling cutters and numbers of flutes in reamers. The majority of manufacturers maintain a fair uniformity in this respect, based on experience. However, materials and machine tool equipment are being developed which in many cases demand numbers of teeth or flutes varying from the old established standard. As a consequence many users of tools are specifying numbers of teeth according to their own ideas. Obviously this classifies the tools as special.

If standards can be established, and adhered to, the consumers will derive benefits, through the elimination of expensive special tools and the substitution of more moderately priced standard tools.

For the general good of the metal-working industries as a whole, a program of standardization should be carried out. Attempts should be discouraged to capitalize by attributing fancied advantages to minor construction details and charging special tools prices for those which legitimately are standard.

Less Tools Advisable

A material reduction in the number of tools now regarded as standard can be effected without any hardship to anyone.

A majority of the tools used in the metal working industries are made from highspeed steel. They are consequently expensive, due to the high cost of the raw material. When it is remembered that a small tool manufacturer must carry in stock some 5000 to 10,000 items of these tools, each in sufficient quantities to care for the possible requirements of the trade, it is easily seen that this imposes on him a large overhead, merely as interest on the investment involved. Therefore, the elimination of a number of items will mean a corresponding decrease in the price of those remaining. Some suggestions are given here, which if followed will accomplish much in this direction. It is at least hoped that these suggestions may serve as a basis for future action. The actual carrying out of the changes proposed must be left to the tool manufacturers, but they can do so only after the consumers have been educated to the economy made possible.

Let us first consider the ordinary straight-shank twist drill with which everyone is familiar. In the sizes up to and including ½-inch diameter the following standard sizes are listed:

Straight-shank wire drills; straight-shank letter-size drills; straight-shank drills, jobbers' lengths; straight-shank drills, taper-shank lengths. Summing this up we have the following total: Straight-shank wire drills, 80 items; straight-shank letter-size drills, 26 items; straight-shank drills, jobbers' lengths, 31 items; straight-shank drills, taper-shank lengths, 29 items; total, 166 items.

This does not include the approximately 140 sizes of millimeter drills under ½-inch diameter, nor the various odd styles of straight-shank drills such as tell-tale drills, dowel bits, etc. We are here dealing only with the types of drills in general use.

The establishment of sizes, appear to have been entirely empiric, as there are many duplications or near duplications with the fractional size drills.

Reamers and milling cutters can be made subject to methods of standardization and with equally profitable results. No specific proposals are made, because

it is realized that such standards must be created through suggestions from a wide field, and through careful consideration and discussion of the suggestions offered.

The British Engineering Standards association in 1920 published a bulletin entitled *British Standards for Milling Cutters and Reamers.* From the introduction to this publication the following is quoted:

"The standards herein contained have been arrived at as a result of conferences, research, and direct co-operation between the small tool makers, machine-tools makers, and users of this country, at whose instance the work was undertaken."

An examination of the work done by the British engineers reflects their desire for uniformity in both design, tolerance, and nomenclature. Much of the material could probably be bodily adopted for use in this country, while some of it would necessarily have to be changed to suit our own conditions.

The desirability of having definite limits established is recognized. It seems that as far as reamers are concerned there would be an excellent field for co-ordination with the existing standards of tolerances on shafts and holes.

Uniformity of nomenclature particularly is desirable to avoiding confusion and loss of time. Frequently a customer will order some sort of tool never heard of. When asked for further particulars, it is found that a standard tool is wanted, but that a local term is used for designating the same.

The engineering societies in taking up this question of standardization of small tools will perform a service to the manufacturers of tools, but more particularly to the users.

Determining the Best Way To Do Work

BY FRANK B. GILBRETH

ALL managers know that the merits of the methods used by different workmen vary greatly. Few managers, however, realize the extent of variation. In our work of searching for the one best way to do work, we have not yet found any two workers who do their work in exactly the same manner. In our 37 years in motion study we have never found a method of any worker that could not be improved upon by substituting in part the method of some other worker. We have never found a method synthesized from the best worker obtainable that could not be improved by the leisurely examination of micromotion records of such methods. It is by no means rare to find that the man with the best motions can perform his work in one-third of the average time of his fellow worker. The man with the quickest method often has also the least fatiguing method.

Inferior methods of many journeymen are handed down through generations of apprentices who do not realize their resulting handicap and who try to imitate whatever is taught to them regardless of how inefficient it may be, while the few pupils of the most expert do not necessarily have the opportunity to acquire the special skill or the superskill of the expert. It is less than four hundred generations of apprentices back to the cave man, less than two hundred to the stone age, less than a score of generations to many journeymen who could not read and write and less than one generation to the recording of the one best way and skill of the super-expert.

The device here presented is an inexpensive stereoscopic viewer of magazine rolls of moving picture photographs on paper, of time and motions. It is called the "magster" for short, signifying a magazine filled with stereographs. It is a device of trivial cost which has been used to permit all investigators and learners alike to see the super-expert's methods in infinite detail in a leisurely manner. It permits maximum transference of skill from the super-expert without personal contact. It permits interchange of demonstrations of skill from all parts of the world without the presence of the super-skilled demonstrator. No longer is there excuse for the misled apprentice and learner and the perpetration of inferior designs of tools, unnecessary fatigue-causing work places and inefficient methods of work than there is excuse for perpetrating inferior strains of horses, cows, sheep, pigs and hens.

Complete Data Is Given

This device provides what in effect are consecutive stereoscopic snapshots. Each picture includes a microchronometer or rapid clock which records a different time of day in each picture, which with the cross sectioned floor, background and table gives records of length, breadth and depth of paths of motions. It also gives exact time, relative time, exact speed, relative speed and direction of motions. In fact, the magster furnishes all that is needed to permit complete examination as slowly and as leisurely as may be desired, all of the peculiarities of conditions and method that enable the best worker available to demonstrate the best way to do work.

The demonstrations of the one best teacher are as usable after he passes away as when he lives at his best. The machine permits the slowing down of motions made at the speed of practice to that of still pictures. It presents to the learner not merely moving pictures but consecutive snapshots showing the elements of causes of skill. Fast motions and slow motions are not alike as to relative speed, relative positive and negative acceleration, path, direction, muscle rebound or automaticity. This device permits the capture of complete details of methods and also the errorless times of their elements in three dimensions by means of a stereoscopic cinematograph, and the viewing of the permanent printed picture on paper with a wide angle stereoscope permitting a dozen or more pictures to be in the field of view for comparison at the same time without winding the paper record.

Alongside each picture is the reason and the proof of the features contained therein that show its excellence. The symbols of the "therbligs," or elements of motions, illustrated by the records may be entered on the margin and the learner stimulated by such questions as—"what is wrong with this element?"—"how could this element be eliminated?", etc. This also insures suggestions for improvement and adaptation to each individual learner for greatest output and with least fatigue, for even the method of the best man obtainable is not perfect. It also allows a chance for extended discussion leisurely and during the period of demonstration when much can be gained.

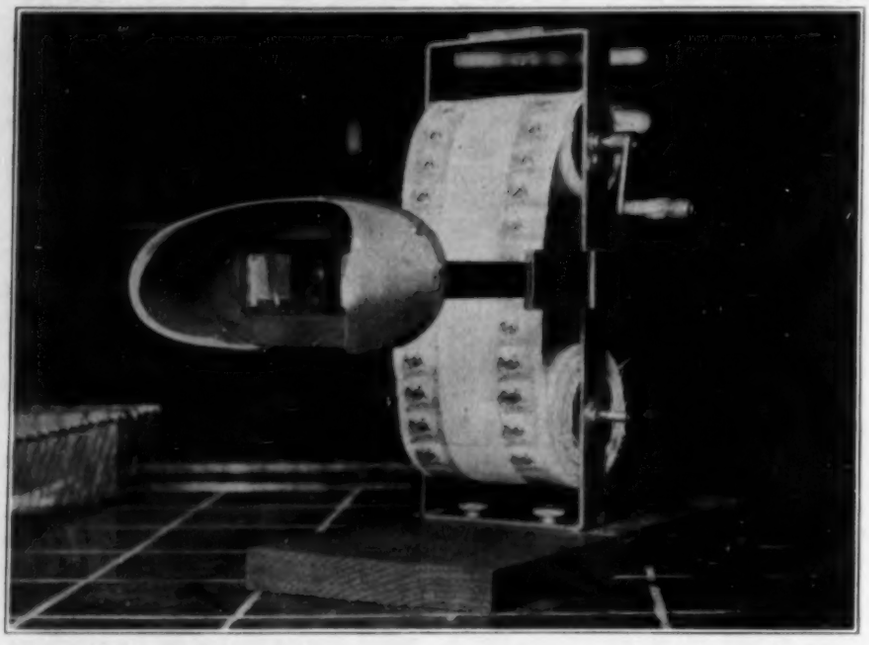
The apparatus is sufficient and complete for the recording of the elements of motions and for the making or comparing of simultaneous motion charts. Other devices made from the original micromotion negative, from which the paper prints were made permit viewing the records as stereoscopic moving pictures either on paper or on film. These we have used since 1913, and they will be described in a

From a report of the fatigue committee of the Society of Industrial Engineers presented at the New York meeting of that society, Oct. 18-20. The author is president, Frank B. Gilbreth, Inc., Montclair, N. J.

later paper which will be presented shortly.

The magster is usable by those who do not have the opportunity, the super experts to demonstrate apparatus available, or the micromotion technical experience and knowledge to capture and record in complete detail the one best way to do work. It puts the long years of research, development and practice of micromotion study within the reach of the nontechnical foreman and worker, the apprentice and the beginner. As a result, the magster now makes it no more necessary for the one who wishes to see the one best way to do work demonstrated, to make the record, neither our broad interest and contact nor our attention to detailed methods and devices affecting unnecessary fatigue.

Knowledge of the one best way to do work disseminated throughout the world would help to reduce the gigantic preventable waste which has been evaluated by the Society of Industrial Engineers and by the National Safety council as averaging more than 20 cents per day per worker in the United States. It will be interesting to note how long is required for the country to overcome its mental inertia and to discard its present ridiculous customs and traditions of teaching its people



WITH THIS DEVICE MOTION PICTURES OF HUMAN OPERATIONS ARE SLOWED DOWN SUFFICIENTLY TO PERMIT DETAILED STUDY

than it is necessary to make a graphophone record in order to use such a record.

This device is offered to the engineering and teaching professions, but first of all to this committee, without patents, with the hope that each community, school and library will have rolls of records of the super skill of the best demonstrator obtainable regardless of where he may be and regardless of whether he is living at the time that his super skill is examined and imitated. Thus, it is possible now to present to the apprentices and workers of the world the chance to see the methods of the best workers available, in their chosen life work, which is a step toward their acquiring first habits and automaticity in method.

As this committee grows in size and diversity and in extent of geographical distribution, it is inevitable that our lines of activities must increase. It is to be hoped that we will abandon their life works. This committee should serve as a headquarters for fatigue elimination information and its meetings as a medium of exchange for the latest theory and practice in fatigue elimination work.

Examine Tool Steel for Internal Structure

The United States bureau of standards recently secured a sample of carbon tool steel, which had been described in one of the technical journals, and upon microscopic examination it was found that an almost complete graphitization of the cementite in certain portions of the rolled bar was responsible for the peculiar appearance noted. The examination indicated clearly the nature of the structural and chemical conditions which account for the unusual fracture shown by the steel. The characteristic shape of the graphitic portion of the bar suggests that some condition originating in the ingot is responsible for the relative ease of graphitization of this part in annealing. The ordinary chemical analysis showed no essential difference between the different cross sectional zones of the bar and hence did not show any indication of what this condition might be.

Congress May Reorganize Goverment Divisions

Transfer of the bureau of mines and the geological survey from the department of the interior to the department of commerce is unofficially stated to be contemplated by the departmental reorganization bill slated to be introduced at the coming session of congress. The recommendation is said to propose three major divisions for the department of commerce—industry, trade and merchant marine—with a bureau of transportation in the trade division.

The interstate commerce commission, federal trade commission and shipping board are left outside the regular departments, as at present. The 10 departments would be called state, commerce, treasury, justice, education and welfare, labor, defense, agriculture, interior and communications. The commercial work now done by state department officials abroad would be transferred to the department of commerce. Within the present cabinet there is some difference of opinion concerning the merits of the proposed reorganization, and the press of other work upon congress will militate against final action upon the matter at this session.

Claims Danger from Coal Shortage Is Averted

"Resumption of large-scale industries such as steel plants and the relatively high operation of other plants shows that industrial coal is adequately distributed and without apprehension for future supplies," says the chamber of commerce of the United States. "The menacing coal situation arising out of the five months' suspension of production has been met and solved. The movement of coal for shipment via the Great Lakes to the Northwest has now reached a point that guarantees adequate supplies at that point before the close of navigation. The domestic user is clearly assured of domestic supplies, although individual preference as to kind may not always be met and may require some substitution of other coal."

Writes Treatise on Grinding

Production Grinding, by Fred B. Jacobs; cloth; 218 pages, 6 x 9 inches; published by the Penton Publishing Co., Cleveland, and furnished by IRON TRADE REVIEW for $3.00 postpaid.

As its name implies, this book is devoted to a description of the grinding methods followed in representative plants devoted to the manufacture of accurate products. It appeals directly to machinists, toolmakers, grinding machine operators, grinding room foremen, superintendents, production engineers and plant managers. The various chapters are devoid of theory being written from data gathered from actual manufacturing operations.

The book illustrates and describes hundreds of typical grinding operations, giving full data as to the wheels used, grinding output, methods of handling the work, etc. It also illustrates and describes hundreds of special fixtures and appliances for handling grinding room work. As a ready reference book it is invaluable for checking up production figures as representative operations can be consulted. The first four chapters are devoted to descriptions of grinding methods used in automobile manufacture.

Production grinding also is a vital factor in the manufacture of tractor parts. A chapter is devoted to tractor-part grinding operations. The grinding work described includes precision operations, such as crankshaft grinding and balancing, centerless grinding operations, the surfacing of parts on rotary chuck machines and the grinding of large units, such as cylinder heads and transmission cases from rough castings. Valuable data also are included showing how disk grinding is used to advantage in the finishing of many parts.

The important part played in abrasive engineering practice in the reconditioning of automotive engine parts by regrinding has not been overlooked. While this is a comparatively new branch of grinding practice, regrinding shops now are established all over the country, wherever automobiles are used. At one time it was thought that a few years' service wore out the average automobile beyond repair. Today, however, it has been proved that worn automobile engines can be reconditioned by regrinding the cylinders, fitting new pistons and rings and regrinding the crankshaft. Comparative figures are given showing the costs of reconditioning an automobile engine by regrinding.

The manufacture of milling cutters furnishes the material for an interesting chapter. Contrary to the generally accepted opinion, special machinery is not employed extensively in shops devoted to this work, but the description of the operations given reveals that grinding is the most important factor to consider in making cutters on a commercial basis. This chapter can be read with profit by any production engineer, grinding machine operator or toolroom foreman. Die grinding, which is recognized as an important development in the art of grinding has been given attention.

In compiling data for books, the author often is content to obtain illustrations at haphazard, writing his text matter to fit. In the preparation of this book a different method was followed as every illustration is a reproduction of a photograph taken under the personal observation of the author for the purpose in mind. Particular attention was given to details so that each illustration of the 188 which are included conveys a distinct message. *Production Grinding*, as a descriptive book on grinding methods will prove of great value to the practical man. It should be in every shop, library and in the hands of every man who devotes his time to the finishing of accurate work by grinding.

* * *

Pictures Life in Mills

Steel, the Diary of a Furnace Worker, by Charles Rumford Walker; cloth, 157 pages 5½ x 8 inches, published by the Atlantic Monthly Press, Boston, and furnished by IRON TRADE REVIEW, Cleveland, for $1.75 net.

In the summer of 1919, the author, a Yale graduate, who recently had resigned a commission as first lieutenant in the regular army, went to work on an open-hearth furnace located in the vicinity of Pittsburgh, his idea being to learn the steel business. He first was given the job of clean-up man in the pit, and this was followed by third helper on the open hearth. Later he worked in the cast house, became a member of the stove gang, and at length achieved the semiskilled job of hot blast man on the blast furnace. The book is the record of the man's life written from the diary of notes put down during the off time while working on the 10-hour day shift or the 14-hour night shift, the change in shifts being made once a week. For the experience gained in contact with the various types of men employed in the mills, the author draws the conclusion that the present time periods of work are not conducive to best results in obtaining labor.

* * *

Describes Belt Conveyors

Belt Conveyors and Belt Elevators, by Frederick V. Hetzel; cloth, 333 pages, 5¾ x 9 inches, published by John Wiley & Sons, Inc., New York and furnished by IRON TRADE REVIEW, Cleveland, for $5 net.

This book is intended to be used as a text by those seeking information on the principles underlying the design and operations of belt conveyors and belt elevators. These machines are applicable to such a wide variety of materials under different operating conditions that they are used here to illustrate the general principles underlying conveying and elevating machinery. The book is divided into two sections the first dealing with conveyors and the second with elevating problems. The first two chapters are devoted to a general description of the parts of the machine, which is followed by a brief history of the

belt conveyor in the United States and other countries. One of the most important features of this type of conveyor is the belt. Methods of manufacture and testing are well described for rubber, canvas, steel, steel mesh and steel rope belts.

The author next describes the various operating parts of the conveyor, such as the supporting and guiding parts, the driving mechanism, tension and takeup devices, and also the various methods used in loading, unloading and protecting the belt. The second section takes up the general description of the parts of the elevator, the pick up and discharge mechanism, the theory of the centrifugal discharge elevators for grain, pulp, etc., elevator buckets, continuous bucket elevators, the various kinds of belts used in this work, methods of fastening the buckets to the belts, methods of driving belt elevators, elevator boots and elevator casings.

* * *

Labor Injunction Issue Expounded

The Labor Injunction, by John P. Frey, 197 pages, 5 x 7¾ inches; published by the Equity Publishing Co.

One of the clearest thinkers in the trade union movement has written a thorough account of the labor injunction problem as it appears to the man of organized labor. John P. Frey, the author is editor of the *International Molder's Journal*, Cincinnati, and is favorably known for conservative contributions to the literature of trade unions. He has set out to prove this statement, appearing in the preface of his book:

"The grave situation created by the unauthorized and plainly usurped power exercised by courts of equity during industrial disputes has compelled the American trade union movement and liberty-loving citizens, who place their confidence for the future upon the guarantees and provisions of the federal constitution, to protest with all the vigor at their command against the constantly growing tendency of equity courts to interfere with contestants during an industrial dispute by restraining the wage earners from the enjoyment and exercise of the same rights and privileges which are enjoyed by employers.....The trade union movement places dependence for its own ability to succeed upon constitutional legislation and having the same properly applied and construed by the courts."

Whether or not the reader agrees with the author in his conclusions, the book is well worth reading to get the trade union viewpoint on an important issue. An introduction is written by Samuel Gompers. Then follow chapters such as: A short historical review; the abuse of equity power by the lord chancellors; courts of equity in the United States; the British "precedents" for injunctions against labor; home-made "precedents" and the judicial conscience; the pitfalls of theories developed by the American judiciary; the rights of the "wage earners;" creating and supporting class distinction; the basic right of trial by jury; a summary of facts presented; in conclusion, the question of remedy. Many pages are devoted to citations from court decisions.

* * *

Lists Reasons for Losses

Why Manufacturers Lose Money, by Robert Grimshaw; cloth, 176 pages 5 x 7½ inches, published by D. Van Nostrand Co., New York, and furnished by IRON TRADE REVIEW, Cleveland, for $2 net.

While the ground is not covered exhaustively, practically all of the principal and most of the minor causes of loss in manufacturing plants are discussed in this book. In considering the many reasons for manufacturers actually losing money or making less profit than they should, the author has found it desirable to classify them into the following divisions: Financial, commercial, organizational, accounting, technical, personal and miscellaneous. Under the financial heading, various factors such as capital, credit, collections, appropriations and purchasing methods result in insufficient returns to the company. Inefficient purchasing, improper methods of shipping, selling and transportation and products which are old fashioned and not within the needs of the buying public cause losses which may be classified under the heading of commercial losses.

The effectiveness of the organization plays an important part in the stoppage of losses as well as methods and practices in use in the accounting department. The chapter on technical losses refers to the plant, the kind of equipment, planning and routing. The losses falling under the heading of personal lossses may be due either to the management or the workers. A variety of reasons not directly connected with any of the above causes are listed in the last chapter of the book.

* * *

Lists Business interests

New England Business Directory and Gazetteer, 1922, cloth, 2442 pages, 6 x 9½ inches, published by Sampson & Murdock Co., Boston, and furnished by IRON TRADE REVIEW, Cleveland, for $10 net.

The directory gives well arranged information of companies, firms or individuals in business, manufacturing or professional lines, listed under the proper heading. The classification is made by state, business and postoffice, with the exception of Boston and Providence, which are given in a separate department. A thumb notch marks the department for each state, where each name is arranged alphabetically by postoffices. The Gazetteer of New England, a section of the book, gives concise information of all cities, towns, stations and postoffices, including location, population, travel directions, etc. Maps of each state printed in four colors are inserted at the beginning of each state department.

A street map of the business section of Boston also is included. In addition to the complete lists under their respective headings, a selected list of the larger manufacturing concerns is presented, giving capital stock, date of organization, present officers, nature of product and number of employes. Miscellaneous information such as a register of the state and county officers, courts, etc., census returns by towns, counties and states, parcel post information, express lists and other valuable data is indexed ready for reference. The catalog section contains a representation of the leading manufacturers, giving such detailed information about each as would be of value to the user of the directory.

* * *

Publishes Estimators Handbook

New Building Estimators Handbook, by William Arthur; imitation leather, 1002 pages 4½ x 7 inches, published by the U. P. C. Book Co., New York, and furnished by IRON TRADE REVIEW, Cleveland, for $6 net.

This volume is a revised edition of a handbook written to serve architects, contractors, appraisers, engineers, superintendents and draftsmen engaged in building work. In this new edition a different typographical dress has been used, and while the type is more condensed then in former editions, it is just as legible. The pages are slightly larger. The first chapter discusses the various kinds and methods of measurements used by the building trade, with the next chapter giving a description of the quantity system of estimating. The following chapters give in detail the information and rules to be used in the course of building construction, beginning with excavation and filling, piling and underpiling, concrete work, reinforced concrete, stone, gravel, marble and terra cotta, brickwork, cement stone, structural iron and steel, tile and plaster. The various operations necessary in finishing the building are described, such as carpenter and joiner work, millwork, sheet metal work, plumbing and gas fitting, electric and conduit work, etc. While giving all of the necessary data, an effort has been made to keep the book as concise as possible in order that it may be easily carried in the field.

Fig. 1—Exterior view of new sheet mill of Ashtabula Steel Co. as it appears from southwest. From left to right the steel stacks serve the galvanizing pots, semicontinuous annealing furnace, the eight sheet and pair furnaces and the power plant. The building at the right of the water tower houses the pulverized coal equipment

Builds Sheet Mill at Lake Port

New Plant at Ashtabula, Financed Largely by Local Capital, Enjoys Favorable Location for Manufacture of Black and Galvanized Sheets—Powdered Coal Used Throughout—Annealing Furnace Is of New Design

BY E. L. SHANER

IN 1917, when the production of black sheets reached a new high mark of 2,367,752 tons, the industry was encouraged to greatly expand its rolling capacity. New mills sprang up rapidly and in 1920, at the height of activity, 73 plants produced a total of 2,886,401 tons of sheets.

Had the demand continued unabated throughout 1921, the mills of the country would have been kept busy, but with business almost at a standstill, production fell off almost 50 per cent from that of the previous year. The striking contrast between strenuous days of 1920 and the quiet period of 1921 suggests the question as to the normal sheet requirements of the country. The upper solid line in Fig. 2 shows the variation in production since 1913, while the lower line indicates the number of active sheet mill plants. The two parallel broken lines show roughly the trend of production and number of plants, assuming that future gains are equal to those of the past 8 years. If this method of reasoning is reliable, it means that the sheet demand may be expected to increase nearly half a million tons every three years. This means that about three 8-mill plants would have to be built each year to meet the demand.

Therefore, although the setback of 1921 may have been discouraging, it is evident that a normal demand in 1923 will tax the capacity of existing plants, and that plants starting to operate in 1922 and 1923 undoubtedly will find ample business for their mills. This, then, is the situation confronted by the sheet mill of the Ashtabula Steel Co., which first rolled sheets on August 17, 1922.

The new Ashtabula mill is primarily a local institution. It was fostered by the Ashtabula chamber of commerce, the initial promotion work being conducted under the direction of H. W. Luethi, who later was succeeded by A. J. Horn. The plant was largely financed by residents of Ashtabula county, although some stock is held by persons in other sections of the country. Ashtabula is considered a good location for a sheet mill because of several important reasons. With the Nickel Plate, New York Central Lines and Pennsylvania System, the city has exceptionally good rail service to the east, west and south. The mill is on favorable terms with valley mills

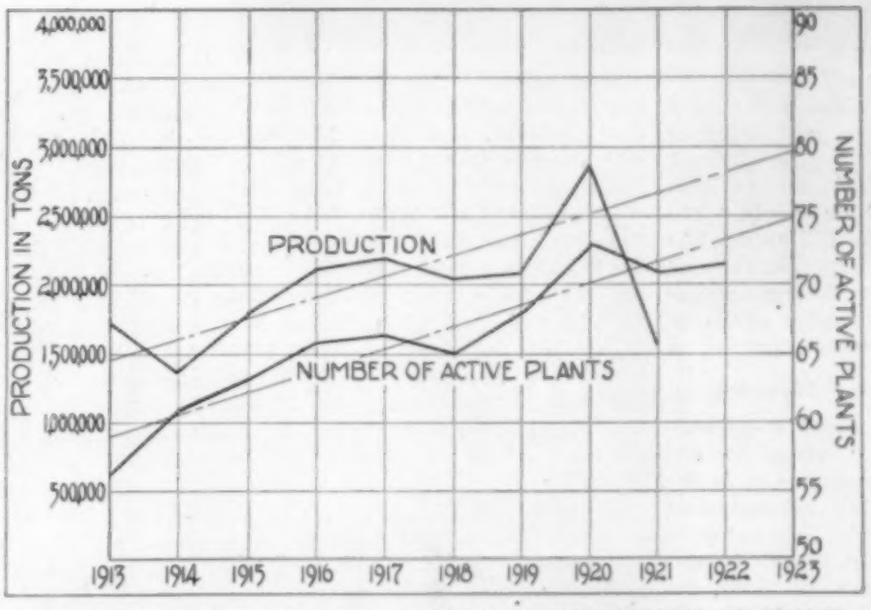


FIG. 2—CHART SHOWING SHEET PRODUCTION AND NUMBER OF PLANTS

The upper heavy line shows how production of sheets since 1913 has steadily increased except for the sharp slump during the depression of 1921. The upper light line indicates the probable upward trend of production. The lower heavy line represents the number of active plants, while the light line shows the probable trend, forecasting the approximate number of new plants required to meet increasing needs. The chart is from statistics of the American Iron and Steel institute

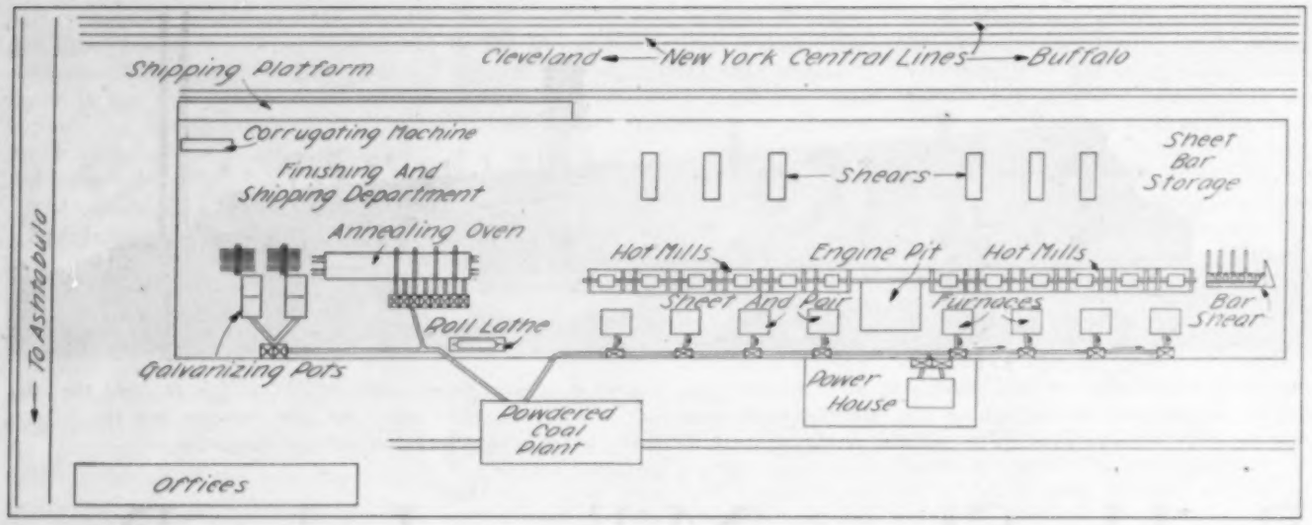
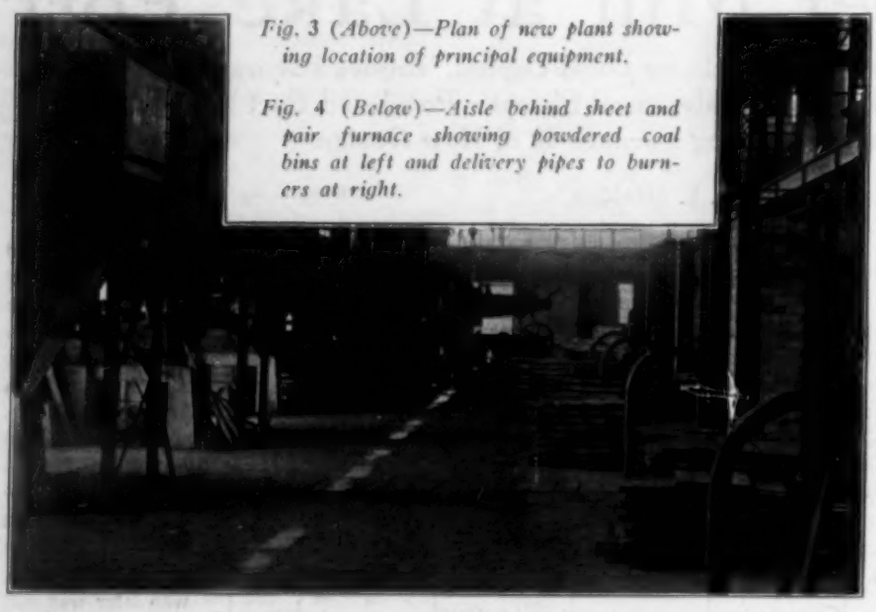


Fig. 3 (Above)—Plan of new plant showing location of principal equipment.

Fig. 4 (Below)—Aisle behind sheet and pair furnace showing powdered coal bins at left and delivery pipes to burners at right.



on freight rates to the Detroit consuming district, and is within a short distance of the sources of coal and sheet bars, the two principal materials used. The location also is advantageous from the standpoint of labor supply. The close proximity of the mill to the lake is another favorable factor, as the cool nights enable the workmen to recover quickly from the exhausting effects of the heat on warm summer days.

Powdered Coal Used Throughout

The new plant has several unique engineering features. It is one of the few self-contained sheet rolling units in the country, being absolutely independent of outside sources for water, light and power. Moreover, powdered coal is employed exclusively for fuel under the boilers and for the sheet and pair furnaces, annealing furnace, galvanizing pots, and coal dryer.

The principal building is a steel structure 624 feet long and 166 feet wide situated in the northwest corner of a 48-acre plot lying south of the New York Central railroad. The building, which was erected by the McClintock-Marshall Co., Pittsburgh, is unusually high for a mill structure, and has extra roof reinforcement to withstand the heavy winds which sweep inland from Lake Erie. The center bay, 66 feet wide, is served by a 30-ton electric traveling crane equipped with a 10-ton auxiliary hoist. On either side of this main bay is a 50-foot bay, the one on the north being served by a 5-ton crane and the one on the south by two 10-ton cranes. These four traveling cranes were built by the Cleveland Crane & Engineering Co., Wickliffe, O. As indicated in Fig. 3 sheet bars enter the mill on cars on either of two tracks at the east end of the building. When needed, the bars are taken from stock and piled by means of the crane on the horizontal part of the skidway shown in Fig. 8. Workmen slide the bars down the incline onto the power-driven rolls shown in the illustration, which carry them to a motor driven bar shear furnished by the United Engineering & Foundry Co., Pittsburgh. The sheared bars are carried in specially designed cradles by one of the 10-ton cranes in the south bay to the charging floor of the combination sheet and pair furnaces, of which there are eight, spaced equally in two groups of four. Each furnace is fired by a single powdered coal burner situated at the back of the combustion chamber. The powdered coal apparatus will be described in detail later in this article.

The rolling equipment consists of eight mills, including five roughing stands, two cold rolls and a set of pinions. The screw boss arrangement of the housings differs from that of the conventional design in that there are no upper parts. The mills were built by the Hyde Park Foundry & Machine Co., Hyde Park, Pa.

Drive Mills by Uniflow Engine

The cold rolls are at the east and west ends of the line of mills, while the engine, a 28 x 36-inch, duplex uniflow unit built by the Nordberg Mfg. Co., Milwaukee, is situated in a pit between two groups of four hot mills. The engine is rated at 1600 horsepower but is capable of delivering 3000. Its speed of 150 revolutions per minute is reduced through a 5 to 1 reduction set built by the Falk Co., Milwaukee, the rolls therefore being driven at a rate of 30 revolutions per minute. Four steam doublers are situated conveniently in the aisle between the sheet and pair furnaces and the mills.

Ample floor space has been provided on the catcher's side of the mills for the accumulation of packs to be sheared. Six shears, built by the Hyde Park company, parallel the line of mills and are spaced so that each group of three serves the corresponding group of four mills on either side of the mill engine.

After being sheared, separated, and piled, the sheets are carried by crane to the west end of the building for the annealing, pickling and finishing opera-

tions. The annealing furnace is worthy of special mention because of its unusual design. The furnace is of the semicontinuous type and consists of two parallel chambers, each accommodating six boxes. Each chamber has a sliding partition in the center, which separates the heating compartment on the east from the cooling compartment on the west. The fuel is fed to each chamber through four burners situated about four feet below the floor level. The cooling compartments are provided with a series of horizontal flues, which may be supplied with cold air by means of blowers manufactured by the Buffalo Forge Co. The ingoing air takes up the escaping heat from the cooling boxes, and this heated air is conducted into the heating compartments to assist in bringing the boxes up to the desired temperature.

As indicated in Figs. 3 and 7, the boxes are charged at the east end and removed from the west end. The boxes rest on cars which are moved through the furnace by means of chains passing through underground ducts.

Temperature Control Is Factor

The accurate temperature control afforded by the use of powdered coal, coupled with the gradual cooling permitted in this furnace, is said to be noticeably favorable to the life of annealing boxes. Boxes and bottoms which had been in service continuously for two months, showed practically no effects of heat at the time of the writer's visit to the plant.

Pickling and galvanizing operations are carried on in the southwest corner of the building. Six pickling tanks, manufactured by the United Engineering & Foundry Co., are employed. These tanks are served by a 10-ton crane operating in the south bay.

One galvanizing pot, which is in operation, and a second unit now under construction, also were furnished by the United company. The heating units are laid out in V-shaped formation so that the fuel may be supplied from a single bin. This arrangement has the virtue of conserving space at the firing end, and also of positioning the parallel pots, conveyors and dryers far enough apart so that there is ample floor area for weighing and handling the galvanized sheets.

The finishing and shipping departments are in the northwest part of the building. Here the equipment consists of four scales made by the American Kron Scale Co., New York; a corrugating machine built by the Streine Tool & Mfg. Co., New Bremen, O.; and a roller leveler furnished by the United Engineering & Foundry Co. The floor is of brick with aisleways of steel plate construction. A series of doors on the north side of the building lead to a shipping platform which is paralleled by a depressed track accommodating about 10 freight cars.

Preparing Coal For Firing

One of the most interesting features of the new mill is the powdered coal installation. Coal is dumped from hopper cars into a track hopper in the coal plant situated south of the main mill

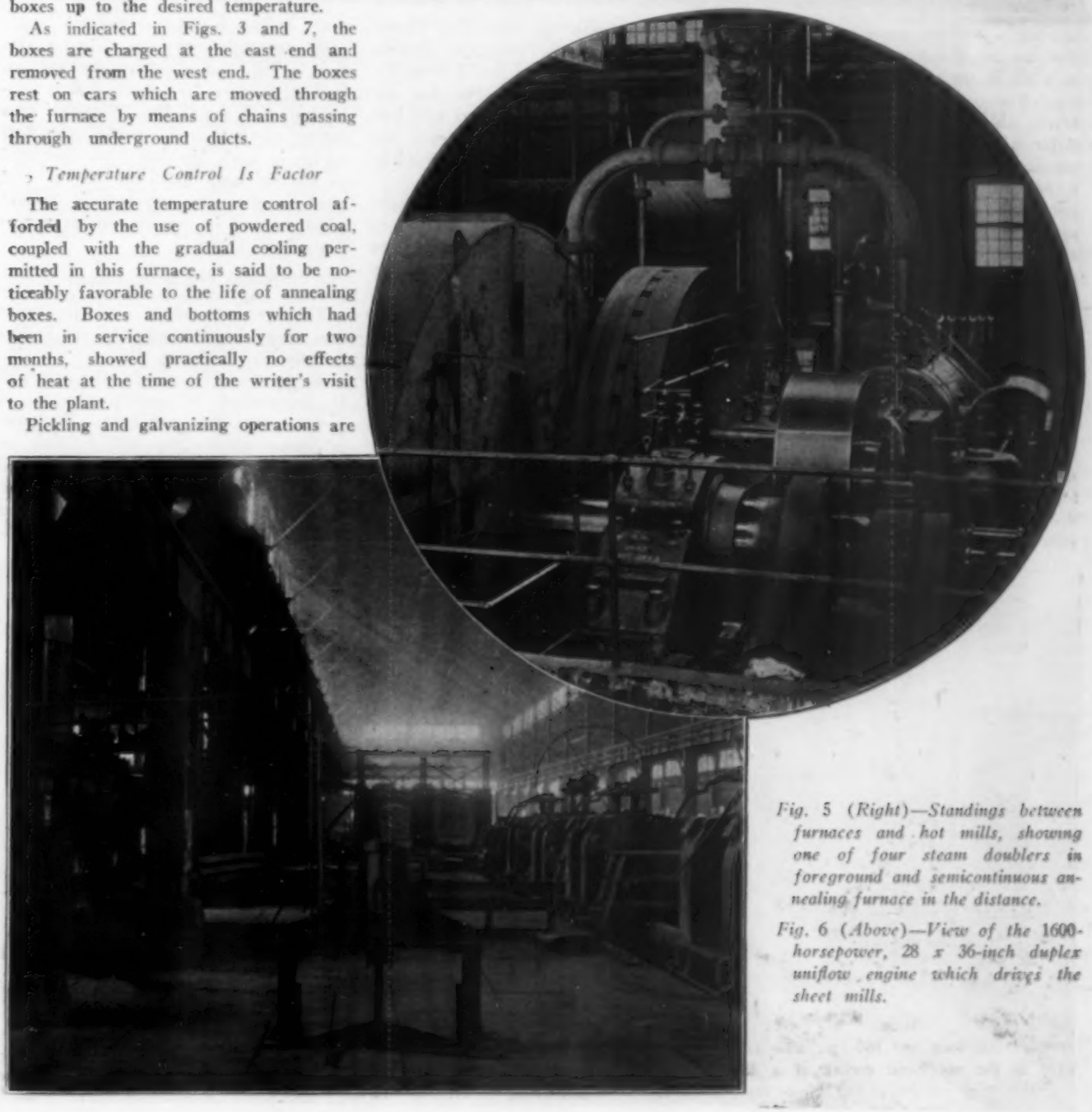


Fig. 5 (Right)—Standings between furnaces and hot mills, showing one of four steam doublers in foreground and semicontinuous annealing furnace in the distance.

Fig. 6 (Above)—View of the 1600-horsepower, 28 x 36-inch duplex uniflow engine which drives the sheet mills.

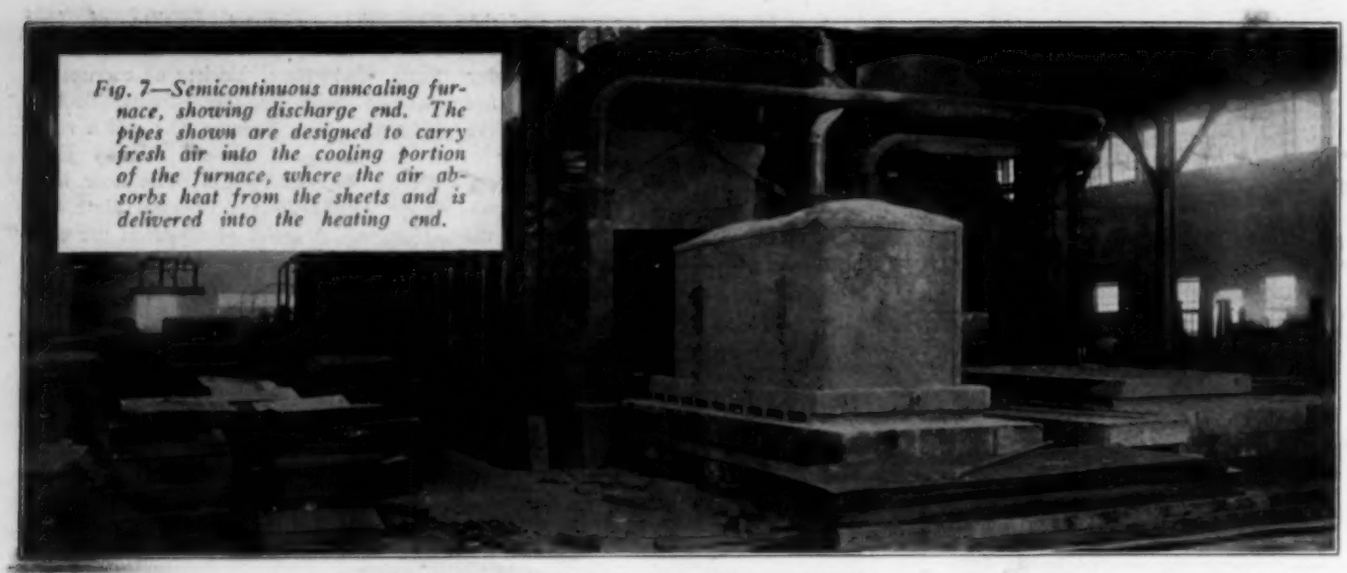


Fig. 7—Semicontinuous annealing furnace, showing discharge end. The pipes shown are designed to carry fresh air into the cooling portion of the furnace, where the air absorbs heat from the sheets and is delivered into the heating end.

building. A short conveyor carries the coal to an elevator which deposits it in a bin in the upper part of the building. The coal is delivered to a rotary dryer, which is fired by powdered fuel. After drying, the coal goes to the pulverizers and then to weighing bins where it remains until needed. The two bins are free to move vertically in steel frame supports, and are suspended from levers communicating with dial scales at the floor level.

Two Lines Deliver Fuel

Two fuel transmission lines connect the coal plant with the mill. One delivers fuel to the galvanizing pots and annealing furnace, while the other serves the sheet and pair furnaces and boilers. Each fuel consuming unit has its own coal bin, which is provided with one hopper for each burner. For example, each sheet and pair furnace is supplied by a bin with a single hopper, as each furnace has only one burner. In the case of the annealing furnace, however, the supply bin has 8 hoppers—one for each burner. The bin for the galvanizing department has two hoppers to accommodate the two pots, and the power plant bin likewise has two hoppers, one for each boiler.

The feeding apparatus is uniform throughout the plant. The coal drops through the hopper onto a small screw conveyor driven by motor through a reduction gear set. After being discharged by the screw, the fuel falls into a horizontal pipe where it is caught in a current of air supplied by a blower, and swept to the burner where it is ignited. The motors for the screw conveyors were manufactured by the General Electric Co., Schenectady, N. Y.; the reduction gears by the Foote Bros. Gear & Machine Co., Chicago; and the blowers by the Buffalo Forge Co., Buffalo. One unit is required for each burner. It is apparent from the foregoing description that the weighing system in the coal plant enables the attendant to know how much fuel is supplied to each supply bin. However, as a further check to avoid overfilling, a float device in each bin has been connected to electric lamp indicators in the coal plant so that the attendant is warned when the coal in any bin reaches a predetermined height.

Power House Equipment

The entire powdered coal equipment was designed and installed by the Fuller-Lehigh Co., Fullerton, Pa.

As mentioned previously, the new mill is independent of outside sources of power, water, heat and light. The power house adjoins the mill building on the south at a point opposite the mill engine pit. Water is pumped from wells on the property to an elevated steel tank. Steam is generated in two 450-

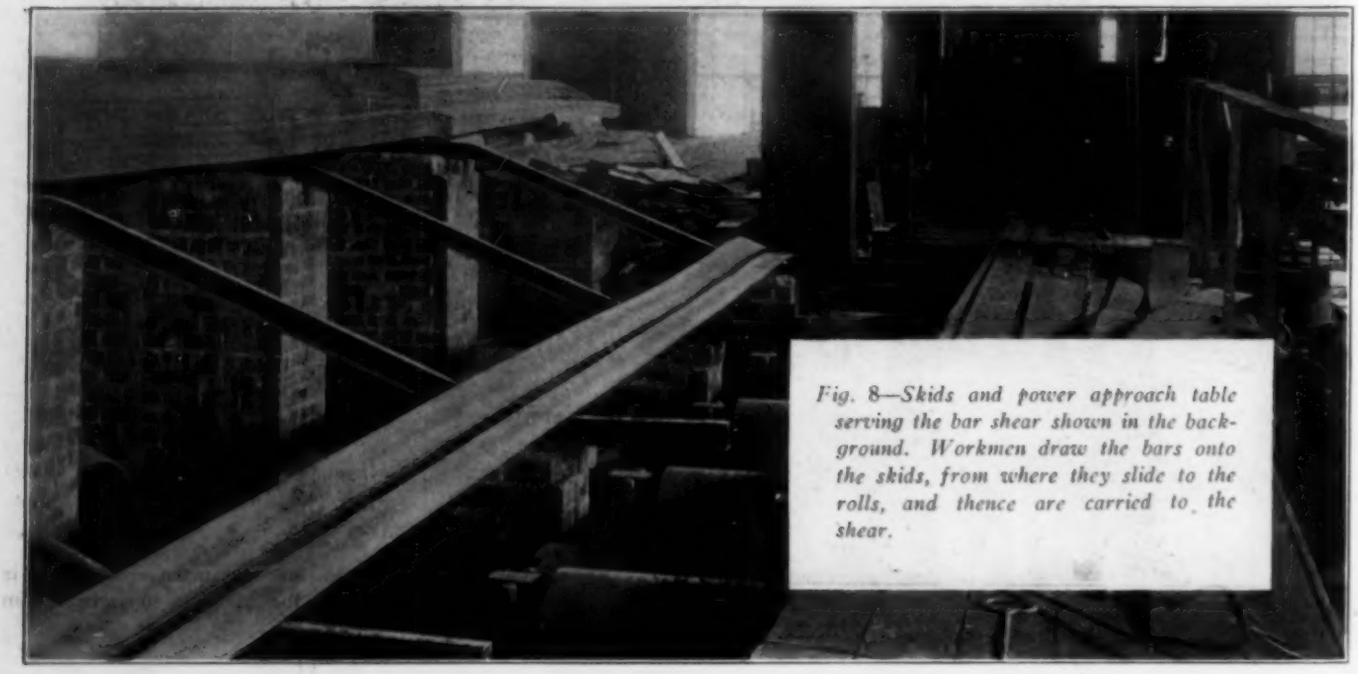


Fig. 8—Skids and power approach table serving the bar shear shown in the background. Workmen draw the bars onto the skids, from where they slide to the rolls, and thence are carried to the shear.

horsepower water tube boilers built by the Union Iron Works, Erie, Pa. The use of powdered coal for fuel eliminates stokers, handling of ashes, etc.

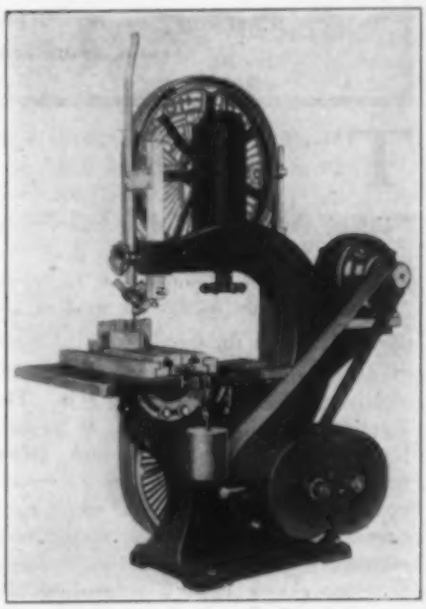
A single cylinder, 22 x 32-inch uniflow engine, built by the Nordberg company is the principal prime mover in the power plant. It operates at 150 revolutions per minute and is rated at 750 horsepower. Alternating current at 60 cycles, 230 volts, is produced by a generator built by the General Electric Co. and direct current at 240 volts is generated by a unit built by the Crocker Wheeler Co., Ampere, N. J. A spare set for direct current consists of a Crocker-Wheeler-type generator and an engine built by the Buffalo Forge Co.

Fig. 9—One of the galvanizing machines from the dryer end.

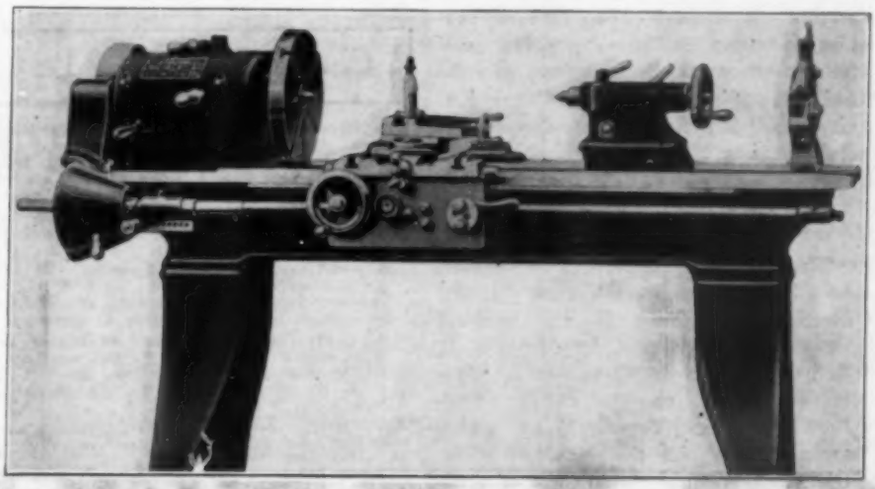
Manufactures New Sizes of Engine Lathe

Screw cutting engine lathes in sizes ranging from 12 to 14 inches and suitable for use in government shops, tool rooms, automobile factories, garages, vocational schools, colleges, universities and for general manufacturing purposes, have been introduced recently by the Oliver Machinery Co., Grand Rapids, Mich. Two kinds of head stocks may be furnished, cone pulley or all steel geared head, and either of these may be belt or motor driven. The cone pulley is of the inclosed or bowl type, having three steps. The single pulley drive geared headstock is of the totally inclosed type with gears running in an oil bath which provides good lubrication and silence in operation. A view of the machine is shown in the accompanying illustration. Six spindle feeds are secured by means of two levers located in the front of the machine. One lever operates a positive jawed steel clutch engaging either the back gears or the direct drive while the other lever shifts the three engaging gears to provide three spindle speeds direct drive and three speeds through the back gears.

The driving pulley of the geared headstock is fitted with a friction clutch operated by a shifting bar extending the length of the lathe. The lathes are equipped with a positive tooth feed reversing clutch, by means of which both the longitudinal and cross feed and the direction of the lead screw may be reversed without engaging or disengaging the gears or stopping the lathe. Attachments furnished in connection with the lathes include motor drive, taper attachment, follow rest, gap bed, oil pan, pump and piping, turret on the carriage, turret on the bed, draw-in attachment, metric transposing gears, metric lead screw, etc.



PORTABLE BAND SAW WHICH CUTS BOTH WOOD AND STEEL



SCREW CUTTING ENGINE LATHE WHICH MAY BE EQUIPPED WITH BELT OR MOTOR DRIVE

Designs Duplex Portable Type Band Saw

A new portable, duplex type band saw for wood and metal cutting has been introduced recently by the Racine Tool & Machine Co., Racine, Wis. The accompanying illustration shows a view of the machine which has several unique features of design. By means of a two-speed attachment and a special saw guide it is possible to interchange the wood and metal bands quickly or to use the various combination spring temper blades for cutting soft metal or wood at high speed. The saw wheels are of cast aluminum, thus reducing the total weight of the machine. The table is designed to tilt at any angle up to 45 degrees, operating on a quick acting saddle. A two-speed attachment is provided for securing the proper speeds for cutting steel and other metals and the change of speed is accomplished by shifting a lever. Wheel guards are also made of aluminum and swing on hinges to give access for changing blades.

The machine is driven by a ¼-horsepower induction type electric motor furnished for any desired voltage, phase or cycle. The motor is bolted directly to the platform, with flexibility provided by means of a belt drive. Without attachments the machine weighs 200 pounds and with the two-speed transmission and metal cutting vise weighs 285 pounds. The height of the machine over all is 39 inches; the table is 16 inches from the floor.

October By-Product Coke Tops Monthly Average

Washington, Nov. 21.—By-product coke production in October totaled 2,806,000, higher than the average for any month in the history of the industry. The by-product ovens operated at a rate of 76.5 per cent of capacity. The month's output was 562,000 tons greater than September, an increase of 25 per cent, and 226,000 tons, or 9 per cent, over June, the previous high month this year. The monthly average by-product ontput for the past five years and for October and September this year, together with beehive and the total follows:

	By-Product	Beehive	Total
1917	1,870,000	2,764,000	4,634,000
1918	2,166,000	2,540,000	4,706,000
1919	2,095,000	1,638,000	3,733,000
1920	2,565,000	1,748,000	4,313,000
1921	1,646,000	462,000	2,108,000
1922 Sept.	2,244,000	606,000	2,850,000
1922 Oct.	2,806,000	878,000	3,684,000

May Move to Capital

The Association of Railway Executives may move its headquarters from New York to Washington, if plans decided upon by a special committee of the association are adopted by the member roads Dec. 7 in Chicago. It is the impression that another chairman to succeed the late Thomas De Witt Cuyler will be elected immediately. The duties of the chairman, it is believed, will be assumed by a committee to be appointed later. Judge A. P. Thom will be retained as counsel of the association.

The special committee feels that from now on the association should devote itself only to broad and national policies. It is expected that much of its future work will relate to legal and legislative matters and that this program can be handled more exeditiously from a Washington office. Judge Thom has been in Washington and the bureau of railway economics and certain departments of the American Railway association also are located there.

Southern Iron Merger Is in Abeyance

New York, Nov. 21.—Negotiations for the merger of a number of Alabama pig iron, coal, coke and iron ore properties are being held in abeyance. Consummation of the merger plan is deferred owing to some legal difficulties. How soon these difficulties can be threshed out is not yet known.

The merger was to have resulted in a company with capacity for producing more than 500,000 tons of pig iron annually, and self-contained as to raw material. The properties included in the negotiations are the Central Iron & Coal Co., which is a subsidiary Square, New York, from whom copies of the Iron Products Corp., the Alabama Co., the Woodstock Operating Corp., the two Vanderbilt furnaces of the Woodward Iron Co., the Alabama By-Products Corp. and some ore lands in addition to those of the Central Iron & Coal, Alabama and Woodstock companies.

Large Italian Steelworks Is Reorganized

The Ansaldo Steel Works is being reorganized by the formation of a new company bearing the same name and having a capital of 200,000,000 lire, states Consul Dominion at Rome in a report to the department of commerce. The new company is taking over the principal plants of its predecessor, including the Sampierdarena machine shops and locomotive works, the Sestri Ponente dockyards, the Campi cannon foundry, the Cornigliano steel works, bronze and aluminum plants, the Delta steel works and the Fegiano car works. Gio, Ansaldo & Co. have taken 998,750 of the 1,000,000 shares of the new company and the Banca Nazionale di Credito the remaining 1250 shares. The old Ansaldo company retains a cement works, the Voltri dockyards, the Sassari manganese mines and the lignite mines near Sienna.

News of Societies

Past and Coming Meetings of National and Local Trade and Technical Organizations

THE first National Exposition of Power and Mechanical Engineering, to be held in New York, Dec. 7-13 with the exception of the intervening Sunday, will emphasize the need for greater power development and fuel economy through the display of modern apparatus used in the combustion of fuels, in the production and use of power and in the allied engineering arts. The Exposition will be made up of exhibits of prime movers and steam generating devices, stokers, pulverized coal apparatus, refractories, water purifiers, feedwater heaters, economizers, superheaters, blowers, valves, piping, pipe covering, pumps, recording devices, belting and lubrication. The United States bureau of mines and various manufacturing concerns will present an extensive program of motion pictures. The exposition will follow the annual meeting of the American Society of Mechanical Engineers and the American Society of Refrigerating Engineers.

* * *

Hartford Steel Treaters Meet

The Hartford chapter of the American Society for Steel Treating at the meeting held Nov. 17 at Hartford, Conn., was addressed by Maj. A. E. Bellis, Bellis Heat Treating Co. New Haven, Conn., on the subject "Salt Baths for Heat Treating." By special arrangement with the Hartford Electric Light Co. and the General Electric Co., Schenectady, N. Y., several types of furnaces and ovens were on exhibit and actual demonstrations of the processes involved in the address were conducted by a representative from the General Electric Co.

* * *

Discusses Transportation

At the regular monthly meeting of the Engineers' Society of Western Pennsylvania held at the William Penn hotel, Pittsburgh, Nov. 21, Thomas Fitzgerald, consulting electrical railway engineer of Pittsburgh, read a paper on "Planning Mass Transportation Facilities." The paper was illustrated by lantern slides. Service railways, rapid transit and trackless vehicles, and an outline of every possible application to the solution of the urban community development problem, were the topics under discussion.

Convention Calendar

Dec. 4-8—American Society of Mechanical Engineers. Annual meeting in Engineering Societies building, New York. Calvin W. Rice, 29 West Thirty-ninth street, New York, is secretary.

Dec. 7-13—The National Exposition of Power and Mechanical Engineering at the Grand Central Palace, New York.

Jan. 11-12—American Engineering Council. Annual meeting headquarters F. A. E. S., 24 Jackson place, Washington. L. W. Wallace, 24 Jackson place, Washington, is secretary.

Feb. 19-21—American Institute of Mining and Metallurgical Engineers. Annual meeting in Engineering Societies building, New York. F. F. Sharpless, 29 West Thirty-ninth street, New York, is secretary.

April 30-May 3—American Foundrymen's association. Annual convention and exhibition at Public Hall, Cleveland. C. E. Hoyt, 140 South Dearborn street, Chicago, is secretary.

May 3-5—American Electrochemical society, semiannual meeting, Hotel Commodore, New York. Colin G. Fink, 327 South La Salle street, Chicago, is secretary.

Amendments to Rail Act Opposed

Radical-Farmer Group, Lead by LaFollette, Dares Administration To Open Up Transportation Question — Hoover Emphasizes Need for Additional Equipment—Changes at Special Session Appear Doubtful

WASHINGTON, Nov. 21.—Announcement of Chairman Cummins, of the senate interstate commerce committee, that he will shortly introduce amendments strengthening the Transportation act has provoked from Senator LaFollette, leader of the so-called radical-farmer group in the senate, the rejoinder that administration forces dare not bring in these amendments for fear of opening up the entire transportation question.

Chairman Cummins, proposals include making decisions of the railroad labor board enforceable, guaranteeing a living wage to railroad employes, expediting the consolidation of the railroads into a few great systems, and making possible a more efficient pool of rolling stock. Almost simultaneously, Secretary of Commerce Hoover has made public a portion of his forthcoming annual report in which he emphasizes the necessity for revision of the act and especially the purchase of additional equipment.

Asked today whether the interests of the farmer were not parallel with those of industry in making possible the purchase of more equipment, Senator LaFollette scoffed at the reports of car shortage. In Wisconsin, he said, investigation resulted in the discovery of sidetracks crowded with empty cars at a time when the railroads were crying "shortage." When Wisconsin authorities looked into the matter the emptics were run into Minnesota, he said.

"Administration leaders have indicated a desire to rush through a program of legislation accelerating the merger of the railroads into a small number of monster systems and giving the railroad labor board coercive power to prohibit and punish strikes and other lawful activities of employes," said Senator LaFollette. "These proposals must be defeated. For 14 months no amendments to the Transportation act have actually been introduced, for fear of opening the way to the offering of amendments by us. I doubt very much if any amendments at all are introduced by the administration forces."

Oppose Increased Immigration

Senator LaFollette said today that while he has given no great amount of consideration to broadening of the 3 per cent immigration act he will oppose any efforts to increase immigration. The farmer is not feeling a labor shortage acutely, he declared. Whether the matter of immigration will be brought up when progressive members of congress frame their program, he could not say. That organized labor will not be caught napping is indicated by the following statement in the American Federation of Labor's weekly organ:

"A survey conducted by the American Federation of Labor proves that the stories of labor shortage in this country are false. The survey shows that these stories are circulated by newspapers published in cities where men are tramping the streets in their search for work. From the Atlantic to the Pacific, from the Lakes to the Gulf of Mexico comes the same story of men looking for wor."

As outlined by Senator LaFollette, the program of the radical-farmer group at this time is a defeatist one. In the special session which began yesterday, and in the short session lasting from Dec. 4 to March 4, the group will bend its efforts toward defeating the administration's ship subsidy bill, its bill to reorganize the federal departments, and any amendments proposed to the Transportation act.

Subsidy Up For Action

The President's message to congress today, and the recent statement of Chairman Lasker of the shipping board that it will be cheaper and will be more certain to insure an American merchant marine to pay a subsidy than by continuing government operation of the war-built fleet, are in effect a challenge to the radical-farmer group. Floor Leader Mondell in the house has stated he expects the house to consider no legislation other than the subsidy bill and the 10 departmental appropriation measures. The rules committee of the house will attempt to force a vote on the subsidy bill on Nov. 29.

The outlook still is that the subsidy bill will be beaten in the senate, that the Transportation act will not be amended at this session and that the President will not call a special session after March 4 unless the LaFollette group filibusters the appropriation bills to death.

Secretary Hoover's statement on the transportation situation in part follows:

"Railway cars are the red blood corpuscles of commerce, and we suffer from commercial anaemia every year, because they are starved. The losses through short transportation are a tax upon the community greater than the cost of our government, because such shortage not only stifles the progress of production and introduces speculation into distribution, but it also seriously affects price levels.

Hoover Urges Action

"The management of our principal railways today, by all the tests of administration, of load factors, of mechanical efficiency, etc., is the most efficient transportation machine in the world in so far as it is not limited by causes beyond the managers' control.

"The situation has been contributed to by the war, but also fundamentally by the cumulation of experiments in public relations to the railways, both national and state. We have tried uncontrolled operation; we have tried negative regulation in the prevention of discrimination; we have tried nationalization; we are now trying positive regulation. Nationalization would be a social and economic disaster; free operation would reconstruct the vicious practices of 30 years ago. Regulation in some form is necessary, but constructive development of this regulation—to preserve the initiative and responsibility of our railway executives, to secure the fine values of private operation, and at the same time to secure public protection and assure adequate service—is absolutely vital and not necessarily incompatible.

"The present act contemplated the solution of the problem of the weak roads through voluntary consolidation of the weaker and stronger roads into larger systems to be definitely indicated by the interstate commerce commission. There is no doubt that such consolidation would be a large advance in solution to the whole problem.

"There can be no question that action in some direction is imperative, if industry and commerce are not to be further strangled by a shortage in transportation. Whatever may have been the sins of railway finance in the last generation, we are not only suffering from them, but we have maintained an attitude of bitterness in our public relationship to our railways for which we pay thrice over in prevention of their proper development.

"We must have increased transportation, if we are to maintain our growing productivity. We must therefore find a way out of the cycle of systematic starvation of a large part of our mileage and the denudation of our railway managers of their responsibilities and initiative."

Labor Unions Should Be Studied

Congress, Which Has Investigated Railroads, Industry and Other National Factors, Should Make Unbiased Probe of Trade Bodies—Labor Shortage Lies Ahead—Immigration Restrictions Should Be Modified

BY WILLIAM H. BARR

DURING the past few years the railways, public service and other corporations have been repeatedly attacked, investigated and restricted by over energetic politicians. Many industries are, as a result, so closely supervised by either state or federal commissions that industrial life has become a burden and the earning of a reasonable profit for the stockholders almost an impossibility.

In this connection does it ever occur to you that there is little discussion of any dependable, unbiased investigation of the trade unions? Perhaps because it has not been politically desirable to do so. But the time has arrived when congress should determine what value, if any, the trade unions are to the public;

What value they are to the members;

Who are the chief beneficiaries of unionism, and show by comparison the average financial standing of the union worker in a given district as compared with the financial standing of the free American plan worker.

Why are all union controlled commodities more expensive, and to what extent has restriction of output contributed to the increased cost of living?

Congress might also determine what rules of efficiency, if any, govern membership in the trade union.

Why is the training of apprentices limited, and the resulting trade education of our American boys stifled?

How are strike votes taken, and what is the average percentage of the membership voting?

Who counts the votes, and where?

What is the total income of the international unions in America for the last year?

How is it spent?

What percentage goes for salaries of officers and agitators, and what percentage actually returns in the form of benefits to the members?

Why is one man permitted to determine why 50 or 100,000 mechanics willing to work under fair conditions may not do so?

Why are the public utility unions directed by a few men permitted with startling regularity to secure a strangle hold on the prosperity and comfort of our people?

Why is the incorporation of unions and correlative financial responsibility not made compulsory?

Why is it that when the railroad brotherhoods elected that the word "violence" be included in a given contract, that "assault and battery" is not regarded by them as a form of violence?

Why is it that the murder of 60 men by union members and sympathizers in the state of Illinois evokes no voice of protest, and no question as to why the murders were committed?

Why should the unions not clearly define their opposition to every form of public police protection?

Why union members are required under oath to place their union sympathies above their obligations as citizens.

There are many other questions which, if correctly answered, will illuminate an obscure condition which has become a national menace.

How many of our citizens understand that the total union income per annum is approximately $100,000,000? How many know that, in 1921, the bituminous miners alone collected $17,000,000 in dues, most of it provided for them by the operators through the check-off system? Has that $100,000,000 fund been used to promote the prosperity of the union or any other workers? to restore the industrial normality of the country? to stimulate the betterment of working conditions? or has it been used to promote the personal interests and advancement of union leaders?

For there is no relationship between the fundamental principles of the constitution and the working principles of unionism. The latter is directed and controlled by only a smaller portion of a small class. Should they continue unchecked, personal freedom would be threatened and the declaration of independence would be relegated to the archives.

If confirmation of this statement is needed, note well the attacks on the Supreme Court of the United States, the attempts to change and limit its power by constitutional amendment; the effort to control congress and the state legislatures; the imposition of certain restrictive legislation of all except the unions, and the partial success of the unions in absolving themselves from certain laws.

We need a complete exposure of the intent of this privileged class. We must know what the spirit is which animates it, and the people must understand that what they tolerate today, may, tomorrow, be a force for the disruption of our national institutions.

The American Federation of Labor imagines that a conspiracy against its existence has been developed among the large proportion of the American people who approve of the open shop. These plots are detailed from time to time in public utterances of unionist leaders, and nothing but an overtaxed imagination could conceive of the minute details thus given. For there is no plot against the unions except in the mind of those who have for years conspired against industry, and who have utilized the machinery of the unions and the subordination of their members in order to promote these activities.

The open shop is a vivid expression of the determination of the American people to compel in industry the same general rights, privileges, and freedom which the people enjoy under our form of government. For unionism, as practiced, is a nullification of the constitution. It is a form of slavery thinly disguised, yet not always fully recognized by the members of the unions. The open shop, on the contrary, recognizes the responsibility of the citizen and his right to work, as well as his desire to give and receive equitable treatment. It eliminates brutal control of the worker. It emphasizes him as an individual. It permits the fullest recognition of his ambition. It helps him to capitalize his intelligence and his energies. It justifies him in recognizing in his employer an associate in the work that is being done, and, above all, it maintains the self respect of both. It eliminates trickery and sabotage. It puts every man squarely on his own feet, to do his own work and meet his own problems.

The failure of unionism is not so much in its forgotten principles, but in its practice; not wholly in its inspiration, but in its leadership; not altogether in the protective policy it enun-

From presidential address delivered at the annual convention of the National Founders' association, Hotel Astor, New York, Nov. 22-23.

ciates, but in the destructive policy it follows. There should be only expressions of sympathy for the men who have sold themselves into unionism for the benefit of that protection which is so completely lacking. We commisserate with those members who permit subordination of all that is fine in human instincts to the will of men who are not fit to lead.

I venture to predict that a period of genuine prosperity during the coming year will be limited and checked by an unskilled labor shortage, a situation which is due largely to the workings of the present immigration law. It seems to be impossible, however, to convince our lawmakers of this fact. There were certain social conditions which, two years ago, made it desirable to restrict immigration, but instead of enforcing the then existent law which amply protected us, or putting into effect a selective system effective at the point of embarkation, we adopted the present unintelligent method of a three per cent quota under which the lucky ones traveling in the first ship to arrive are sure of admission, while the competent and effective immigrant coming in a little later may be turned back.

As a nation, what are we to do about this immigration question? Is our policy to be dictated by our labor unions? Why turn away the industrial immigrant that we need and admit those educated by undesirable disturbers who are inimical to our peaceful pursuits? For every three immigrants who come to our shore, approximately one and a half leave, and it is the opinion of those who study the arrivals and departures that those going out are of a much higher average type. Day by day, therefore, the labor situation becomes more serious even before we have advanced into any position of material prosperity. Can not this problem of immigration be solved by facilitating the development of the country, rather than by conceding the restrictive and destructive point of view?

To Enlarge Sheet Mill

Plant of the Milwaukee Rolling Mill Co. at Forty-third avenue and Grant street, in West Allis, Wis., will be enlarged by a 100-foot extension of the main sheet mill. The company manufactures blue, black and annealed sheets and has been working three 8-hour shifts most of this year, but is still far behind on orders. The contract for the steel work on the addition, amounting to 100 tons, has been placed with the Worden-Allen Co., Milwaukee.

Tentative Program

Announced for Annual Meeting of American Society of Mechanical

The American Society of Mechanical Engineers has announced the tentative program for the annual meeting to be held in New York, Dec. 4-7. The National Exposition of Power and Mechanical Engineering opens at Grand Central Palace, Dec. 7, giving an opportunity for the visitors to attend both functions. The tentative program is as follows:

Monday, Dec. 4

9:30 a. m.—Council meeting.
9:30 a. m.—Local sections conference.
9:30 a. m.—Public hearing on boiler code.
2:00 p. m.—Joint session with American Society of Refrigerating Engineers.
Evening—Presidential address and reception.

Tuesday, Dec. 5

9:30 a. m.—Management session.
"Ten Years' Progress in Management," L. P. Alford (by title).
"The Installation of Management Methods," Wallace Clark.
"Refining and Rolling Mill for Monel Metal," W. L. Wotherspoon.
"A Visual Method of Control," C. B. Lord.
Progress of reports of committees on:
"Measurement of Managerial Ability," A. L. De Leeuw, chairman.
"Standardization of Terminology," F. E. Town, chairman.
"Standardization of Graphics," J. J. Swan, chairman.
9:30 a. m.—Machine shop session.
"Gearing for Planers," F. E. Cardullo.
"Testing Involute Spur Gears," M. Estabrook.
"Application of Oilgear Variable-Speed Hydraulic Drive to Machine Tools and Manufacturing Processes," Walter Ferris.
"Spherical Gears," C. H. Logue.
"Power Required for Removing Metal," F. A. Parsons.
9:30 a. m.—Materials handling session.
2:00 p. m.—Session on training for the industries.
Joint reports on:—
"Extension and Correspondence Schools," J. A. Moyer.
"Schools for Apprentices and Shop Training," R. L. Sackett.
"Industrial Education as Represented in Schools," C. R. Richards.
2:00 p. m.—Steam tables session.
2:00 p. m.—Research session.
"Effect of Pulsations on Fluid Flow," H. Judd and D. B. Pheley.
"A New Method of Determining the Effect of Speed Upon the Strength of Gear Teeth," Wilfred Lewis
"Torsion of Crankshafts," Dr. S. Timoshenko.
"Orifice Coefficients for Various Sizes of Pipes," J. M. Spitzglass.
"Effects of Large Sudden Steam Discharges on Boilers"—Report of research subcommittee on "Sudden Initial Pop Lift of Safety Valves."
2:00 p. m.—General session I.
Evening, informal dinner and smoker.

Wednesday, Dec. 6

9:30 a. m.—General session II.
2:00 p. m.—Business meeting.
Student session.
Ladies' tea.
2:00 p. m.—Fuels session—Joint session with Stoker Manufacturers' association.
2:00 p. m.—Railroad session.
Evening—Joint session with American Economic association.
"Making Money and Making Goods," W. C. Mitchell.
"The Human Element in Industry," E. M. Herr.

Thursday, Dec. 7

9:30 a. m.—Power session.
"The Commercial Economy of High Pressure and High Superheats in the Central Station," G. A. Orrok and W. S. Morrison.
"Feed Water Heating for High Thermal Efficiency," L. Helander.
"Tests of Stirling Boiler of Detroit Edison Co.'s Connors Creek Station," P. W. Thompson.
"Elasticity of Pipe Bends," Sabin Crocker and S. S. Sanford.
"Transmission of Superheated Steam," B. N. Broido (by title).
9:30 a. m.—Standardization session.
(Under the auspices of the A. S. M. E. Standardization committeee, with the A. E. S. C. co-operating.)
"System of Preferred Numbers," C. F. Hirshfeld and C. H. Berry.
"The Paper and Printing Machinery Standardization Program," W. J. Eynon.
9:30 a. m.—Safety engineering session.
Under the auspices of American Society of Safety Engineers, with A. S. M. E. committee on safety codes co-operating.)
"Safety Codes," M. G. Lloyd. (Discussion led by M. C. Goodspeed.)
"Safety Engineering in Connection with the Compression of Gases," A. D. Risteen.
"Safety Code for Grinding Wheels," G. E. Sanford.
2:30 p. m.—Ordnance session.
2:30 p. m.—Aeronautic session.
2:30 p.m.—Forest products session.
Evening—Dinner dance Hotel Astor.

Beehive Coke Production Gains Sharply

Production of beehive coke in the week ended Nov. 11 increased with a bound after having declined in the week before. The total is estimated by the geological survey as 245,000 tons, an average of 41,000 tons daily. This compares with 215,000 tons or 36,000 tons daily in the week before and 103,000 tons in the week and 17,000 tons daily in the corresponding week last year. The output for the hree periods, by states, follows:

	Week ended Nov. 11 1922	Nov. 4 1922	Nov. 12 1921
Pennsylvania and Ohio	183,000	162,000	77,000
West Virginia.....	23,000	21,000	5,000
Alabama, Tenn. and Ga.	17,000	13,000	10,000
Virginia and Kentucky.	13,000	10,000	7,000
Colorado and New Mex.	5,000	5,000	1,000
Washington and Utah..	4,000	4,000	3,000
United States total....	245,000	215,000	103,000
Daily average.....	41,000	36,000	17,000

Preliminary returns for coal production in the week ending Nov. 18 showed the coal output likely would reach 13,200,000 tons as against a revised total of 11,939,000 tons in the week before. The week ending Nov. 11 suffered somewhat from time lost on election day and on Armistice day.

Decrease Shown in Lead Smelting and Refining

Washington, Nov. 21.—The value of products from lead smelting and refining works in 1921 was $150,593,800, a decrease of 23.5 per cent from the $196,794,500 of 1919, states the census bureau. The cost of materials used was $134,061,100 in 1921 and $179,373,000 in 1919. The number of employes in the 23 works operating in 1921 was 4509 and in the 25 works in 1919, 6483. Wages and salaries paid aggregated $7,264,800 in 1921 and $11,281,400 in 1919. The bureau estimates 1921 operations at 70 per cent of capacity.

Elmira Mill Resumes

The Chemung Iron & Steel Co. has rehabilitated and improved the old plant of the Elmira Rolling Mills Co. in Elmira, N. Y., which it acquired in 1920 and the company now is booking business for its products. These will include bands, bars, small angles, channels, reinforcing bars and special sections.

Says Better Organization Is Farmers' Need

The implement business is at low ebb because the purchasing power of the farmer is at low ebb, President George N. Peck of the Moline Plow Co. and former head of the industrial board told delegates of the Ohio Implement Dealers association at Columbus recently. He said in part:

"The implement business was organized to give farms their original equipment, during our development period. That day is done. We shall now have a replacement business only. The farmer's purchasing power has been cut in two because retail prices have gone up more than wholesale, and the farmer buys at retail.

"American crop prices are not fixed by domestic conditions, but by world conditions. The Chicago price on wheat, is now and always has been the Liverpool price less transportation charges. Now the farmer buys in a tariff-protected market, but he sells in a free trade market regulated by world conditions."

According to Mr. Peck the steps necessary to restore agriculture to an American price are: To organize and finance it to a point where unified sales policy is possible, where it can hold or sell surplus abroad at world price; regulating supply to demand at cost, plus profit on the domestic market; to protect it by a tariff; give it control of its own marketing mechanism.

Otis Steel Has Loss

A deficit of $88,246 is reported by the Otis Steel Co., Cleveland, for the three months ended Sept. 30. This figure is arrived at after interest charges but before allowance for depreciation. The deficit for the first nine months of the year amounted to $705,471 against $1,214,550 in the corresponding period of 1921. The second quarter deficit amounted to $252,037 while the loss in the first quarter was $365,188. Figures for the nine months periods are after charges and reserve for subsidiaries, but before depreciation.

Ore Property Escapes

New York Nov. 21.—Officers of the Bethlehem Steel Corp. have been advised by their agents at Cruz Grande, Chile, where Bethlehem's principal port facilities are located, that comparatively slight damage was sustained by the properties as a result of the recent earthquake and tidal wave. The company's piers were slightly damaged and the railroad roadbed caved in at some points where the ground was filled in. The Chile Copper Co., the Braden Copper Co., and the Anaconda Copper Co. have been informed that their properties were not damaged, despite the fact that they are in the heart of the territory affected. The Chilean properties of the Anaconda company include the Andes Copper Co., the Anaconda Copper Mining Co., the Andes Exploration Co. and the Potrerillas Railway Co.

Ansaldo Steel Works in Italy Is Reorganized

Reorganization of the Ansaldo Steel Works, Italy, is being effected by the formation of a new company, bearing the same name, having a capital of 200,000,000 lire divided into 1,000,000 shares of 200 lire, says Consul Leon Dominion, Rome, in a report to the department of commerce. The new company has taken over the principal plants of its predecessor, among which are the Sampilerdarena machine shops and locomotive works, Sestri Ponente dockyards, Borzon yards, Fegiano railroad car works, Campi cannon foundry, Delta steel works at Cornigliano Ligure, Campi electrical works, Multedo iron foundry, Cornigliano steel works and bronze and aluminum plants.

The purchase price of these establishments is stated to be 28,405,800 lire, and payment has been made to the old Ansaldo Co. by means of 142,029 shares of the new company. The new company furthermore assumes liabilities amounting to 40,261,339 lire on bonds issued for the account of the plants it has taken over and which are guaranteed by mortgages.

The principal Italian steel works, while still retaining their independence, appear to be sufficiently bound together through common directors to operate without competing with one another. The influence of the Banca Commerciale in this industry is strong.

Index Number Advances

Washington, Nov. 21.—The bureau of labor statistics' index number for all commodities for October was 154, compared with 153 for September and 142 for October, 1921. Nine commodities enter into this survey, of which seven advanced in October, one receded and one was unchanged. The index of metals and metal products for October was 135, for September 134 and for October a year ago 116. Farm products, foods, cloths and clothing, metals and metal poducts, building materials, house furnishings and miscellaneous commodities advanced, fuel and lighting receded, while chemicals and drugs showed no change. Wholesale prices are the base for this compilation, and 1913 equals 100.

Improved Inquiry

For Sulphate of Ammonia Noted in South—Tuloul Production Gains

New York, Nov. 21.—With spring contracting under way, new prices have been established on naphthalene at 6 cents to 7 cents per pound, f.o.b. producers' plants, for flakes, and 7 cents to 8 cents for balls. Phenol is scarce with producers sold up practically to the first of the year, and the market largely nominal at 22½ cents, producers' plants.

Toluol is in demand among coal tar distillates. However, there is little trading as sellers not only are booked ahead but are behind in their shipments. A good demand also prevails for benzol, but sellers are behind on orders. Possibly the principal reason for this is the shortage of cars. Sellers are having difficulty in getting back empty tanks.

Prices on coal tar distillates are unchanged as follows: Pure benzol, 30 cents ovens, in tanks and 35 cents in drums; 90 per cent benzol, 27 cents in tanks and 33 cents in drums; toluol, 30 cents in tanks and 35 cents in drums; solvent naphtha, 27 cents in tanks and 32 cents in drums; commercial xylol, 29 cents in tanks and 34 cents in drums; and pure xylol, 30 cents in tanks and 35 cents in drums.

An improved inquiry for sulphate of ammonia is noted in the South, where it is believed that the present higher prices for cotton is having a stimulating effect. In the West and North, demand for sulphate of ammonia is quiet. Foreign inquiry is low. Prices remain steady at $3 to $3.05 works on domestic business and nominally $3.55 to $3.60 port, in double bags on foreign.

Coke Oven By-Products

Spot

Per Gallon at Producers' Plants in Tank Lots

Pure benzol	(nominal)	$0.30
Toluol	(nominal)	0.30
Solvent naphtha	(nominal)	0.27
Commercial xylol	(nominal)	0.29

Per Pound at Producers' Plants

Phenol	(nominal)	$0.22½
Naphthalene, flake		0.06 to 0.07
Naphthalene, balls		0.07 to 0.08

Per 100 Pounds at Producers' Plants

Sulphate of ammonia.....$3.00 to $3.05

Contract

Pure benzol	$0.30
Toluol	0.30
Solvent naphtha	0.27
Commercial xylol	0.29

Per Pound at Producers' Plants

Phenol	(nominal)	$0.22½
Naphthalene, flake		0.06 to 0.07
Naphthalene, balls		0.07 to 0.08

Per 100 Pounds at Producers' Plants

Sulphate of ammonia (12 months) .....$3.00 to $3.05

Union Miners Not Barred from Herrin Jury

Chicago, Nov. 21.—With Williamson county practically divided into two camps, the selection of a jury, in the Herrin massacre case is difficult. Counsel examining prospective jurors have found union miners apparently anxious to be accepted on the jury. These men have been paying 1 per cent of their wages each month into a fund for the defense of the accused miners.

Judge D. T. Harwell has ruled that membership in the miners' union is not a bar to serving on the jury. He holds that to exclude miners because of their union affiliation would restrict service on the jury to the farming population, which is more or less hostile to the defendants.

Seven men were placed in the jury box last week, although not finally accepted by both sides. It is believed the full jury will be selected during the present week.

Crucible Steel Reports Deficit for Year

The Crucible Steel Co. of America in its annual statement for the year ended with Aug. 31 reports a deficit of $3,709,517 for the period. This loss, after taxes, depreciation bond interest and inventory adjustment, compares with net profits of $5,547,245 in the preceding year. The operating loss was $2,165,767 after adjustment of inventory. Dividends amounting to $2,749,817 were paid, making the total deficit for the year of $5,459,334 against a surplus, after dividends of $297,245 in the previous year. This surplus, however, was before depreciation charges, which were set up against accumulated surplus. After the latest deficit the company's sulplus was reduced to $20,008,270.

Asks Increased Funds for Commerce Bureaus

Washington, Nov. 21.—The bureau of foreign and domestic commerce of the department of commerce will receive an appropriation of $2,203,110 for the fiscal year beginning next July 1 if congress accepts the recommendation of Budget Commissioner Lord. This is an increase of $575,325 or 35 per cent over this year's appropriation. The recommendation is for an increase of $100,000 for the various commodity divisions, including iron and steel and machinery, that have been set up in the bureau, and a similar increase for the European services of the bureau. The bureau of standards, which received $1,547,360 this year, will be increased $195,000.

Living Costs Compared

(Percentage over July, 1914)

July, 1914 to	All items	Food	Shelter	Clothing	Fuel and light	Sundries
Jan., 1920	90.2	97	43	170	49	77
Feb., 1920	93.5	101	45	177	49	78
Mar., 1920	94.8	100	49	177	49	83
Apr., 1920	96.6	100	50	188	51	83
May, 1920	101.6	111	51	187	55	83
June, 1920	103.0	115	51	176	61	85
July, 1920	104.5	119	58	166	66	85
Aug., 1920	103.2	119	58	155	69	85
Sept., 1920	99.4	107	59	155	78	88
Oct., 1920	97.3	103	59	148	83	90
Nov., 1920	93.1	93	66	128	100	92
Dec., 1920	90.0	93	66	103	100	92
Jan., 1921	81.2	78	66	87	100	92
Feb., 1921	76.3	72	66	74	98	90
Mar., 1921	68.7	56	71	74	87	85
Apr., 1921	67.6	56	71	69	79	85
May, 1921	65.7	52	71	68	78	85
June, 1921	61.9	45	71	62	78	85
July, 1921	63.1	48	69	64	79	85
Aug., 1921	62.0	48	69	59	79	83
Sept., 1921	64.8	55	69	57	79	83
Oct., 1921	63.7	53	69	60	79	80
Nov., 1921	63.0	[illegible]	69	61	79	78
Dec., 1921	62.7	52	69	57	79	78
Jan., 1922	61.4	50	69	56	78	78
Feb., 1922	57.7	42	69	56	77	77
Mar., 1922	54.7	39	65	56	74	74
Apr., 1922	54.8	39	65	55	74	74
May, 1922	54.9	39	65	56	74	74
June, 1922	55.4	41	65	53	74	74
July, 1922	55.6	42	65	54	74	74
Aug., 1922	54.5	39	65	53	81	72
Sept., 1922	55.6	40	65	55	87	72
Oct., 1922	57.1	43	65	57	87	72

Cost of Living Advances 1 Per Cent in Month

An advance of 1.5 points, or 1 per cent, between Sept. 15 and Oct. 15, in the budget of the American wage earner's family, is reported by the National Industrial Conference board, New York. The changes in the budget were continued slight increases in the average cost of food, clothing and coal. Rents and the cost of light and sundries averaged the same in October as in September. The cost of living as a whole on Oct. 15 was 57.1 per cent higher than in July, 1914. Between July, 1920, when the peak since 1914 was reached, and Oct. 15, 1922, the cost of living dropped 47.4 points or 23.2 per cent. The accompanying tables gives further details.

Develop Italian Iron

Development of the Italian iron deposits at Cogne in the Val D'Aosta by the Anslade Co. is well under way, says Commercial Attache MacLean. This was one of the great undertakings begun by Italy under the pressure of war necessities. The principal problem in this connection was that of transporting the ore to Aosta, where electric furnaces were erected. This was solved by driving a tunnel through the intervening mountain that barred the way. This tunnel, which has a length of 7 kilometers, has just been completed. The importance of the work involved is demonstrated by the fact that 6 years have been required for its construction. The iron deposits in question are estimated at not less than 10,000,000 tons and the mineral is said to be from 62 to 65 per cent pure magnetite, similar to the Swedish deposits, which yield a metal specially malleable. These mines with their equipment of hydroelectric plants, furnaces, etc., are still the property of the old Ansaldo Co., which is understood to be considering offers for their purchase.

Iron Exported to Canada

Washington, Nov. 21.—The Canadian provinces of Ontario and Quebec took in September more than half of the pig iron exported from the United States, or 3768 tons out of a total of 5203 tons exported. England took 675 tons and China 500. Only 445 tons of blooms, billets and slabs were exported in September, 331 tons going to Quebec and Ontario and 114 to Japan. Iron and steel scrap exports in September, according to the department of commerce, included 1007 tons to Japan, 810 to Ontario and Quebec and 529 tons to China.

Raises Molders' Wages

The H. B. Smith Co., Westfield, Mass., has made an agreement with its union molders to pay from $6.60 as a minimum day wage, this being an increase of 60 cents a day to molders not on piecework. The agreement is effective for one year from Dec. 1. The 350 molders demanded an increase of 90 cents a day. Piecework molders will receive a 10 per cent increase. A 15 per cent increase asked by 800 laborers is held in abeyance pending the settlement of the question of a closed shop.

Buy Company Control

Controlling stockholders including a number of the directors of the Toledo Machine & Tool Co., Toledo, O., have disposed of their interests to a small group of capitalists outside of that city. The management of the company was not concerned with the transaction and the new owners will make no changes in the organization. Officers of the company are: President and general manager, Henry J. Hinde; vice president and sales manager, Louis J. Hinde; secretary and treasurer, Charles W. Greening.

Will Blow in Furnace

Announcement has been made that the Cranberry Furnace Co., has decided to blow in its blast furnace at Johnson City, Tenn., on Dec. 10. The furnace will produce copper free low phosphorus pig iron as usual. This stack was blown out during January, 1921.

Ore Shippers Seek Rate Refund

Petition Commerce Commission for Repayment of Extra Charge Imposed on Old Range Haulage, Held by Examiner To Have Been Illegal—Bill of Exceptions Claims Preference Is Shown Corporation Roads

WASHINGTON, Nov. 21.—Repayment of the increases imposed upon iron ore moving from the old ranges since February, 1921, has been asked by counsel for the 88 independent upper lake ore producers who, in the Adriatic Mining Co. case, are contesting all of the upper lake rates on ore. Demand for reparation has been made in the filing of exceptions to the interstate commerce commission's examiner's report in the proceedings. The report approved the present rates from the Mesabi, Cuyuna and Vermillion ranges to upper lake ports. It recommended a reduction to 72 cents in the line-haul rate from the Gogebic range to Ashland, Wis., and from the Menominee and Marquette ranges to Escanaba, Mich., to 54 cents and to 63 cents from the Marquette range and from Ishpeming and Negaunee, to Marquette.

The ore producers ask for the following specific reparation:

On Ashland and Escanaba ore shipments moving between Feb. 21, 1921, and July 1, 1922, the amount by which the charges collected exceeded 85 cents per ton.

On Ashland and Escanaba ore shipments moving subsequent to July 1, 1922, the amount by which the charges collected exceeded 77 cents per ton.

On Marquette ore shipments moving between Feb. 21, 1921, and July 1, 1922, the amount by which the charges collected exceeded 65 cents per ton from the Ishpeming-Negaunee district and 75 cents per ton from the Republic district.

On Marquette ore shipments moving subsequent to July 1, 1922, the amount by which the charges collected exceeded 59 cents per ton from the Ishpeming-Negaunee district and 68 cents per ton from the Republic district.

The complainant's brief in support of its exceptions states:

"Notwithstanding the facility of adjudication, and in spite of the fact that there was presented to the examiner testimony of competent witnesses aggregating over 3500 pages together with 230 exhibits, largely statistics of admitted experts, the proposed report discards or disregards all of this evidence, fails to determine reasonable rates on the existing specific conditions of the traffic, and decides the case solely on the incompetent ground of the relation of ore rates to all freight rates generally, and applies even this standard incorrectly."

A considerable portion of the brief is devoted to the examiner's findings upholding the rates of the United States Steel Corp.'s subsidiary lines in Minnesota. On this subject, it states:

"The ownership by the Steel corporation of the two major ore roads makes a close adherence to cost much more important in the instant case than in rate cases generally.

"Complainants contend that the inclusion of any excessive profit in the rates charged by the Missabe and Iron Range roads operates as an indirect preference to their owner, the Steel corporation. This for the reason that as the profits of those roads belong to the Steel corporation through its complete stock ownership the corporation actually receives a refund of the excess freight on its own ore. Independent shippers receive no such refund. The excess freight which they pay is gone from them forever and finds its way, at least in part, into the treasury of the Steel corporation, their great competitor. The commission, in the Lum case (a former case involving ore rates), recognized the significance of this situation and observed that it necessitates the strictest possible determination of reasonable rates in the following language:

" 'The fact that the United States Steel Corp., through a subsidiary, the Oliver Mining Co., is the largest shipper over these roads cannot be ignored. The fact that the same corporation indirectly controls two of the roads and owns the larger portion of the ore shipped over them, demands a strict interpretation of any standard of reasonableness which is adopted, although the right of these roads to earn a fair return upon the property devoted to public use is not questioned.'

"The examiner dismisses from consideration this important aspect of the case. He does so on the ground that 'The addition of Section 15-A to the interstate commerce act, providing for the recapture of one-half of carriers' excess incomes, changes the situation.' Section 15-A does not 'change the situation' so as to affect or impair in any way complainants' right to reasonable rates. That right prevails—and if existing rates are unreasonable the law provides for their reduction to a reasonable level.

"The new section is simply a legislative recognition of a condition which has always been met in fixing a common level of rates for many roads in a group. Such a level will always yield a greater profit to some carriers and a lesser profit to others. It must, however, be fixed with a reference to the group conditions and not upon the circumstances of either the weakest or the strongest line. This principle has always prevailed. Section 15-A recognizes that it will continue to prevail. Based upon this premise it merely requires a fortunate carrier in such a group to refund to the government one-half of the excess earnings made necessary by a rate level adequate for the group as a whole. It does not authorize or justify the enjoyment of any greater measure of excess earnings than has always been unavoidable under group rate making; in fact, it shows some measure of disapproval of even this degree of excess earnings by providing for their recapture in part. Thus Section 15-A has not 'changed the situation' in any way to lessen complainants' right to reasonable rates.

How Independents Lost

"The examiner evidently thought differently, for though he recognized that the $1 rate included an excess earning to the two corporation roads of 36 cents per ton, he made not the slightest effort to apply the strict test of reasonableness in fixing a rate for the group that would cut this excess earning to a minimum.

"That this excess earning does exist is proved by the cost studies already discussed. It is believed possible to eliminate it entirely without the slightest injustice, for the rule in the Lum case still prevails.

"The present 91 cent rate contains approximately 27 cents of excess earnings per ton of ore. Certainly this should be eliminated just as far as is possible; and complainants' evidence is adequate to enable the commission, in the exercise of its administrative judgment to achieve this result by applying the strict standard of reasonableness to the new range rates.

"The examiner after holding that Section 15-A has 'changed the situation,' presents some figures purporting to show that the amount of excess earnings retained by the corporation roads is 'less than the amount contributed by the Steel corporation.' But the amount retained is stated by the examiner at $5,456,803 for the year 1920, while independents retained nothing. They paid $1 per ton and got none of it back. The Steel corporation paid $1 per ton and got back $5,456,803, which on the Steel corporation's 1920 tonnage of 25,585,687 tons, means 21.33 cents per ton rebate under the $1 rate. The result is that both classes of shippers paid 36 cents per ton more than a compensatory rate and, after a compliance with the excess profits tax law and Scetion 15-A, the corporation had secured its ore transportation at a net rate of 78.67 cents as against $1 paid and borne by its competitors.

"According to the examiner's figures, independents contributed $1,745,475 of the $3,729,906 paid over to the government; nearly half of the total payment, though they shipped less than one-fifth of the tonnage."

Compares American and English Methods

Birmingham, England, Nov. 14.—At the opening meeting of the Staffordshire Iron and Steel institute Joseph Payton was re-elected president and in the presidential address gave a general survey of trade conditions, from the economic point of view, pointing out the injurious effect upon business of the violent exchange fluctuations. He stated there now are signs of improvement indicating that the worst has passed.

F. J. Cook, vice president, gave an address describing his experiences in America during his visit last spring. Examples were given of the abounding hospitality everywhere met with. He was greatly impressed by the size of the plants and their output.

He noted that the general policy looked to the reduction of manual labor, this being accomplished by overhead conveyers and in some cases underground transport. One company turned over the sand every 15 minutes. The individual output seemed remarkable, he said. While the wages averaged about three times that of the Englishman the output was twice as great. Most of the manual labor was done by foreigners with Americans and Englishmen largely in positions of supervision. He stated that few Englishmen would be willing to work at the pace maintained by the manual laborer in America. He declared the quality of the patterns is quite good and frequently equal to English, however, he considered the floor molding far behind the British standard. Some of the machine work is decidedly below the quality which would be accepted by the British buyer.

He believed that in malleable work the Americans are far ahead of the Englishman in quality and output. He said he was surprised at the softness of the malleable castings as compared with British castings.

Mr. Cook said he was impressed by the way in which the castings are dumped into the annealing pans. There is no question of careful packing. The annealing temperature is much below that of Great Britain, 800 degrees Cent. being a usual figure. The results, however, he said, are fine and the elongation tests much better than the general run in Great Britain. Where the Englishman gets from 5 to 8 per cent elongation, 15 per cent in America is nothing unusual, while the tensile strength is 26 tons.

In rolling plants, Americans make greater use of steel rolls partly on account of the reduction in the cost of transport. Mr. Cook declared he still believes, however, that there is no roll like an English cast iron roll with its effective chill.

Frank Somers, Walter Somers & Co., Ltd., Halesowen, and H. Cole Estep, European Manager, IRON TRADE REVIEW, London, took part in the subsequent discussion.

Shows 1921 Copper Slump

Washington, Nov. 21.—Plants smelting and refining copper turned out products valued at only $234,895,200 in 1921 compared with $651,101,600 in 1919, the census bureau states. The number of establishments smelting and refining copper was 28 in 1921 and 34 in 1919. The number of persons engaged was 9746 in 1921 and 19,654 in 1919, with salaries and wages aggregating $14,398,200 in 1921 and $31,619,700 in 1919. The cost of materials was $205,903,900 in 1921 and $584,410,200 in 1919.

Bad Order Cars Fewer

Washington, Nov. 21.—On Nov. 1 the railroads had 249,960 of their cars on line in bad order, compared with 270,045 on Oct. 15 and 345,201 on Nov. 1 last year, the American Railway association states. That the effects of the shopmen's strike have been nullified may be seen from the comparison that on July 1, when the strike broke, 324,583 cars of 14.3 per cent of the number on line were in bad order. On Nov. 1 the percentage had been reduced to 11.

A petition in bankruptcy has been filed against Irma Greenfield, doing business as the Metropolitan Metal Products Co., New York. Liabilities are about $6500, assets about $3000.

Obituaries

WILLIAM GRAVES SHARP, former United States ambassador to France and at one time vice president of the Lake Superior Iron & Chemical Co. which later sold out to the Charcoal Iron Co. of America, died Nov. 17 at his home in Elyria, O. He was 63 years old, a native of Mt. Gilead, O., where he was born March 14, 1859. He obtained degrees at Allegheny and Oberlin colleges and the University of Michigan, became a lawyer, served in congress and was ambassador to France during the World War from Dec. 2, 1914, to April 14, 1919. At the time of connection with the iron and steel industry, Mr. Sharp was also interested in ore properties in the upper Michigan peninsula.

Henry Hirsch, vice president of the American Cutlery Co., Chicago and New York, died suddenly Nov. 15 at the Hotel Claridge, New York. Mr. Hirsch was 57 years old and was a native of Chicago.

Raymond H. Stiles, assistant manager of Jenkins Bros., Boston, makers of valves, died at his home in Wollaston, Mass., Nov. 12 at the age of 40. He was with the firm 22 years and for the greater part of that time was a salesman in the New England territory.

Edward Brown Alsop, age 87 years, at one time affiliated in an executive capacity with the Hussey-Howe Co., Pittsburgh, which now is known as the Howe Brown Steel Co., a subsidiary of the Crucible Steel Co. of America, died Nov. 12 at his home in Washington. Mr. Alsop retired 20 years ago and for the past 15 years has resided in Washington.

Walter M. Spaulding, chairman of the board of directors of the Graton & Knight Mfg. Co., Worcester, Mass., with which he had been identified for more than 53 years, including 13 years as president, died at his home in that city, Nov. 16, aged 76 years. He retired as president last March. He leaves a son, W. Virgil Spaulding, formerly secretary and assistant treasurer of the company.

Albert A. Gordon, 86 years old, for many years superintendent of the Crompton & Knowles Loom Works, Worcester, Mass., died at his home in that city, Nov. 18, of old age. He retired six years ago from active work. He was considered one of the great loom experts of the country. He was the father of the late Lyman F. Gordon, a founder of the Wyman-Gordon Co., Worcester. Another son, Albert A. Gordon, is superintendent of the loom works.

Charles Henry Hutchins, chairman of the board of directors of the Crompton & Knowles Loom Works, Worcester, Mass., of which he was president for 20 years, died at his home in Shrewsbury, Mass., Nov. 15 aged 75 years. He had been identified with the industry for 38 years and was president of the Knowles Loom Works at the time of the consolidation with the Crompton Loom Works in 1897. Mr. Hutchins was president of the United States Envelope Co., and prominent in banking and financial circles.

Northwest Business Is Improving

General Situation Leads to the Belief That 1923 Will Bring Large Trade Increases—Contracts Awarded for Shipyard Work—Building Projects Involving Large Sums Announced

Special Correspondence

SEATTLE, Nov. 11.—Business in the Pacific Northwest shows an exceedingly healthy tone with practically normal volume appearing in all lines. The whole situation gives rise to general optimism while the indications are that 1923 will bring additional prosperity to this section. The largest cloud on the business horizon at present is the shortage of cars, which seriously handicapped some lines of business in October. Fruit shippers in the interior of the state have been facing a serious situation although it is hoped that before the end of November conditions will be materially relieved. The same situation has handicapped the lumber industry and in some instances manufacturing plants have been forced to close because of the inability of the railroads to move the output.

Shipping showed the customary fall activity during October. The movement of freight was handicapped by the railroad situation but on the whole the volume shipped was satisfactory. After a period of inactivity the Oriental market is showing signs of revival and increased inquiries for Northwest products are being received from China and Japan.

Exports of wheat and flour from Columbia river and Puget Sound, usually heavy at this season, are below normal. This is due to the high prices of Washington and Oregon wheat and the reduced buying ability of European markets. However, the price of British Columbia wheat is on a competitive basis and an unusual amount of grain has been booked for export from Vancouver. During October, European markets were more active and the indications are that Great Britain and Northern Europe will make heavy purchases on this coast during the winter.

Freight rates to the Orient have been stabilized by the reorganization of the Pacific Westbound conference, thus ending a rate war that has been waged actively for the last six months. On the intercoastal route, rates are still at low levels but peace overtures have been made and a readjustment of freights may be expected shortly. The volume of cargo moving on the intercoastal lines is establishing a new record, the amount of lumber offered for Atlantic ports being greater than can be handled by the tonnage.

In the lumber and logging industry general activity prevails, many mills, especially those at tidewater, working two and three shifts.

Representatives of steel mills are more optimistic over the outlook. They report a better demand for their products, with bars, plates, small structurals, nails, building materials, sheets and pipe being sold in increased quantities. Jobbers state that their October business equaled September which was the best month of the year. The indications are that November will be equally good. Warehouse stocks are exceedingly low and increased buying is noticeable to replenish many lines. The question of delivery is at present the greatest anxiety.

It is too early for fish packers to place their tin plate orders for next year's pack. Some of them are expecting better prices while others are not yet certain how much material they will need for next year's output.

Business is fairly good with the metal trades at Puget Sound centers and particularly at Portland. All the shops have a reasonable quantity of work at hand and the same is true of the foundries. The logging and lumber industries are furnishing much of the business and this is expected to continue indefinitely. The wage scale in the metal trades remains stationary and there are no labor troubles. However, a shortage of first class machinists and molders is reported, it being almost impossible to get a sufficient number of the latter class of workmen.

Shipyard Outlook Improves

There is a better outlook for the steel shipyards. During the month the Todd yards, Tacoma, obtained the contract for a $1,000,000 steel steamer to be built for the Alaska Steamship Co. This plant is also completing three scout cruisers for the navy. Todd Dry Docks, Inc., Seattle, has several large repair jobs on hand resulting in a larger working force and increased activity on the docks and in the machine shops. The Williamette Iron & Steel Works, Portland, is building 80 steel pontoons for the United States engineers corps. The corps will open bids soon for eight steel fuel barges. Repairs costing $40,000 and involving the removal of 50 steel plates from the hull of the damaged steamer KETCHIKAN will be made by the Oregon Boiler Works, Seattle.

The oil companies are showing much activity. The Associated Oil Co. has purchased a site and has awarded a contract for building two large storage tanks and a general terminal in Seattle. The General Petroleum Co. has leased Port of Seattle storage tanks where a fueling station will be established for furnishing oil to Shipping Board vessels. The Union Oil Co. is making preliminary surveys preparatory to constructing a new $500,000 storage plant at Edmonds, a suburb of Seattle. Announcement has just been made that the Bethlehem Steel Co. will establish a branch sales office in Seattle, about Jan. 1.

Building activity in Seattle, Tacoma and Portland continues unabated, new projects involving considerable sums being announced. More than 20 apartment houses, costing $3,500,000, are under construction in one residential district of Seattle. Building permits issued in Seattle in October totaled $2,249,035, bringing the total for the ten months of 1922 up to $16,731,540. It is expected that the year's record will exceed any previous twelve months in the history of Seattle. The highest total reached in his city was $19,044,853 in 1909.

In addition to the $3,000,000 hotel contemplated for Seattle, a $1,000,000 hostelry is to be built at Tacoma while Astoria, Aberdeen and Centralia are also planning new hotels. The contract for the Astoria community hotel has just been awarded at $169,248. This building will be eight stories and fireproof.

Contracts for erecting three bridges, two of steel and concrete and the third of concrete construction for the state of Oregon have been awarded to the Union Bridge Co., of Seattle. At Tigh a steel bridge 120 feet long will be built for which the Pacific Bridge Co., Portland, will furnish the steel. The Wallace Equipment Co., Seattle, will supply the steel for the 80-foot bridge at Eddyville.

The Grays Harbor & Northern Railway Co. has been formed at Hequiam for the purpose of building a railroad into the Olympic peninsula. This road will tap much virgin timber the owners of which will assist in financing the project. The Bloedel-Donovan Lumber Mills are planning building a railroad between 22 and 25 miles in length from timber holdings in the Olympic peninsula to tidewater.

Here and There in Industry

Live Information Which Records the Expansion of Various Lines of Productive Enterprise

THE Premier Mfg. Co., Newtown, Conn., maker of gas, electric and water instruments, has taken over the W. & B. Douglas Co., Middletown, Conn., maker of pumps, and also the Standard Metal Work Corp., Thompsonville, Conn. The Premier Mfg. Co. is to increase its capital stock to about $1,500,000 to operate the combination. Each company will continue to make its own lines, but the sale and distribution will be handled by the Premier company with Middletown as the probable headquarters. Charles H. Cole is president of the latter company, which has been in business 20 years. Dale D. Butler, president of the Douglas Co., will continue as such until the reorganization takes place. The Douglas Co., which is 90 years old, also operates a foundry. Mark W. Bushnell, president and treasurer of the Standard Metal Work Corp. plans to retire shortly, but his brother, Guy F. Bushnell, secretary assistant treasurer and superintendent will continue in an official capacity with the new owner.

* * *

CONTRACTS for more than $150,000 worth of ventilating equipment for public schools have been booked within the past month by the Carlson Bros. Sheet Metal Co., Superior, Wis., necessitating the enlargement of the works. A $40,000 contract is from Altoona, Pa.

* * *

THE Westinghouse Electric & Mfg. Co. has received a contract to provide the electrical equipment for four harbor dredges which are being built by the Sun Shipbuilding Co. for the United States engineer corps. Electricity will be used wherever possible in the operation of these vessels.

* * *

PULLEY attachments for the Fordson Tractor Co. are being manufactured by the Dallman Machine & Mfg. Co., Milwaukee, which recently absorbed the Smith Sliding Gear Clutch Pulley Co., North Lake, Wis. The Dallman company, which will consolidate all production in its plant, also manufactures all kinds of gears.

* * *

HEAT treating facilities of the Harley-Davidson Motor Co., 3732 Chestnut street, Milwaukee, will be doubled in capacity by the erection of a new 1-story brick and steel building, 85 x 147 feet, plans for which have been completed by the Federal Engineering Co., Stephenson building, Milwaukee. Contracts will be let at once. The estimated cost of the addition is $50,000.

* * *

IN ORDER to be equipped to handle an increasing demand for locomotive and boiler repair work for local railroad shops and concerns in logging and lumber manufacture operating their own railways, the Marinette Boiler Works, Marinette, Wis., is erecting an addition of 5000 square feet. Contracts are being made for the equipment.

* * *

THE Hart & Hegeman Mfg. Co., Hartford, Conn., has purchased for $200,000 the property of the Hartford Auto Parts Corp., maker of universal joints, in that city, to provide for future expansion. The former owner will continue as a tenant of the building. The Hartford Auto Parts Corp. is to sell some of its surplus machinery and equipment but this does not indicate it is to close its plant.

* * *

CONSTRUCTION work has been started by the Westinghouse Electric & Mfg. Co. on a warehouse and repair shop in the central manufacturing district at Chicago. It will consist of four units, with a floor area of 960,000 square feet. The first unit is to be 130 x 240 feet, seven stories. An expenditure of $2,500,000 is involved.

* * *

LUDWIG WOLFGRAM and Julius E. Kieffer of Milwaukee have placed before the Association of Commerce of Racine, Wis., a proposition to establish a plant manufacturing seamless brass and copper tubing, which is being given consideration. The No. 1 plant of the Simms Foundry Co. at Racine is available for an industry of this kind, according to E. A. Bartlett, secretary of the association.

* * *

IN order to keep the shops busy during the winter months, the F. Rassmann Mfg. Co., Beaver Dam, Wis., maker of barn and stable metal fixtures and equipment, tanks, etc., has started the manufacture of a line of children's coaster wagons and disk wheels for Ford, Chevrolet, Star and Gray automobiles. The wheels for wagons and automobiles are made from malleable castings.

* * *

OPERATION of the Meriden, Conn., branch plant of the New Departure Mfg. Co., Bristol, Conn., was started Nov. 13. It was purchased several years ago and reconstructed at a cost of about $2,000,000, but was never opened on account of general business conditions. The product will be annular ball bearings, which department will be moved from Bristol. Charles M. Gearing is superintendent of the Meriden plant.

* * *

THE Coppus Engineering & Equipment Co., and the New England Brass Foundry Co., both of Worcester, Mass., have voted to merge as the Cuppus Engineering Corp., which was incorporated in July with $500,000 capital. The foundry will be operated as a department and will do outside work. The board of directors will be made up as follows: Frans H. C. Coppus, J. Verner Critchley, Frank A. Drury, Linwood M. Erskine, George A. Gaskill, Jerome R. George, and William D. Luey.

* * *

CONTRACT for five electric locomotives recently placed by the New York, New Haven & Hartford railroad with the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has been increased intermittently until a total of 12 locomotives now are covered. These will be practically a duplication of those now in operation in high speed passenger and freight service into the Grand Central terminal, New York. Each locomotive will weigh approximately 181 tons. The equipment will be such that the locomotives can baul a 900-ton train in express passenger service on either 11,000 volts alternating current or 600 volts direct current. In addition to this contract the Westinghouse company is building 39 locomotives for the Chilean State railways, four for the Norfolk & Western, and electrical equipment for four locomotives for the Pennsylvania. Control equipment for locomotives for the Paris Orleans electricification is also under construction.

Men of the Iron Trade

Personal News of a Business Character Regarding the Men of Affairs of the Industry

HARRY W. COFFIN, vice president and general manager of the Alabama Co., Birmingham, has resigned and will engage in business for himself. J. W. Porter, vice president and general sales manager, has been promoted to the position of vice president and general manager. Mr. Coffin was connected with the Alabama Co. as vice president and general manager since the organization of the company in 1913. Prior to that time he was trustee in bankruptcy for the Alabama Consolidated Coal & Iron Co., the former owners of the property now owned by the Alabama Co. Through his management, creditors of the former company were paid off fully.

William H. Raye, president of the Laconia Car Co., Laconia, N. H., has been elected president of the Walter M. Lowney Co., Boston.

Frederick G. Hughes, vice president of the New Departure Mfg. Co., Bristol, Conn., has been elected president of the Bristol chamber of commerce.

Dale D. Butler, president of the W. & B. Douglas Co., Middletown, Conn., maker of pumps, has been elected president of the Middletown chamber of commerce, succeeding John A. Ruffin, removed to New York.

L. J. Creelman has taken a position as structural engineer for the F. A. Coleman Co., Cleveland. Mr. Creelman was formerly chief engineer of the Blaw-Knox Co. and located at its Baltimore office.

Frank Nickerson, for nine years with the Midvale Steel Co., on the Pacific coast has resigned and will become manager of the Los Angeles office of the Bethlehem Steel Co. which will be opened about Jan. 1.

J. F. Hulse, formerly connected with the Consolidated Steel Corp. and the Trumbull Steel Co., has associated himself with the Trumbull Steel Co.'s New York office, 3846 Grand Central Terminal.

A. B. Ambler, Pacific coast manager for the Alan Wood Iron & Steel Co., with headquarters in the Sheldon building, San Francisco, has opened offices in the Higgins building, Los Angeles. Leroy Richards, for five years with the company in their eastern offices, is in charge.

Benjamin Drewes has resigned as foundry superintendent for the Kissel Motor Car Works, Hartford, Wis., to become assistant superintendent of the foundries for the Fairbanks Morse Mfg. Co., Beloit, Wis., assisting R. J. Barr.

Larry J. Barton, formerly consulting metallurgical engineer, San Francisco, has taken over the management of the new electric furnace foundry of Dibert, Bancroft & Ross, New Orleans, and will be located in that city.

Mitchell S. Little, president of the M. S. Little Mfg. Co., the Sigourney Tool Co., the Smythe Mfg. Co., and the Hartford Valve Mfg. Co., all of Hartford, Conn., has been elected a director of the Aetna Life Insurance Co.

H. G. Trimble, who has been identified with the National Supply Co., Pittsburgh, for several years, lately as district sales manager at Pittsburgh for the eastern district, has been promoted and transferred to be manager of sales at Toledo, O.

Emile Utard, president of the Franco-American board of trade, sailed recently for Havre with a voluminous report on the effect of the new American tariff on the importation of French goods here, which he will submit to the chambers of commerce throughout his country. Mr. Utard said he thought his trip would consume about six weeks.

A. S. Blanc, for four years Pacific coast agent for the Consolidated Steel Corp., with headquarters in the Monadnock building, San Francisco, has joined the organization of the Bethlehem Steel Co. and will be in charge of the new Seattle office of that company which will be opened the first of the year in the L. C. Smith building, Seattle.

R. L. Beers, who has been appointed chief engineer of the Detroit Stoker Co., Detroit, was graduated from Syracuse university in the class of 1912 in mechanical engineering. He spent four years with the United States bureau of mines doing research and testing work on various fuels and combustion apparatus. Mr. Beers then left the government service to do special combustion work with the United States Radiator Corp. Four years ago he was appointed testing engineer of the Underfeed Stoker Co. of America and was later promoted to the position of assistant chief engineer.

E. P. Merrill has been appointed general manager of steel sales of the British Empire Steel Corp., with headquarters at Montreal. Mr. Merrill has been for the past three years located at Sydney as general manager of the Dominion Steel Corp. Alexander Dick, who has been for a number of years general sales agent of the Dominion Coal Co., is appointed general manager of coal sales of the British Steel corporation with headquarters at Montreal.

Dr. Percy Longmuir, who has been appointed director of research of the British Cast Iron Research association, has been active in the industry from 1897 and his career as foundry apprentice, foreman, manager and finally director have brought him distinction in both the practical and scientific phases of the industry. He received his metallurgical training at Sheffield university, after which in May, 1902, he was awarded a Carnegie research scholarship by the Iron and Steel institute which was renewed in 1903. He received the Carnegie medal for research on the subject of the influence of varying casting temperatures on the properties of alloys. Later he engaged in research work at the National Physical Laboratory and the results of his investigations in collaboration with Sir Robert Hadfield and Professor Carpenter were published in the report of the alloys research committee of the Institution of Mechanical Engineers. Dr. Longmuir then engaged as foundry consultant and was appointed examiner of metallurgy for Sheffield university. From 1909 to 1919 he was works manager at the Stocksbridge works of S. Fox & Co., Ltd., and at present is technical director for H. Rossell & Co., Ltd., Sheffield. Dr. Longmuir was one of the founders of the Institution of British Foundrymen and was president in 1910 and again in 1911.

Shop Equipment Demand Small

Users Confining Purchases to Absolute Necessities—Inquiries Are Numerous but Call Generally for Single Tools—Some Railroad Business Pending—Crane Buying Is Fair and Is Expected To Broaden

METALWORKING machinery demand continues of a listless character. There is practically no buying for the future and the single tool orders which are being placed represent bare necessities. However, in some districts a turn for the better appears imminent, this being particularly true of Canada and the Central states. The little buying which has been indulged in during the past week has been scattered and no particular industry appears to be taking more tools than another. The automotive industry has been an active buyer.

Orders now are being placed by the Pennsylvania railroad for the equipment for its Altoona, Pa., shops. The Norfolk & Western railroad was a buyer of the week, as was the Cornwall railroad. Railroad inquiries before the trade include ones from the Chesapeake & Ohio, the Pittsburgh & Lake Erie, the Pennsylvania and the New York Central. With the exception of the Pennsylvania list, none of these inquiries are what in normal times would be considered large.

Single tool inquiries predominate but these are exceptionally numerous. However, indications are that most of them will be held pending until after the inventory season.

Despite the apparent dull demand, recently established new equipment prices generally are holding. It now is understood that Canadian tool manufacturers have followed the lead of American builders and advanced prices 10 to 15 per cent. However, some price shading in Canada is reported on desirable orders. Secondhand machinery prices generally are not as firm as they were a few weeks ago, due probably to the fact considerable surplus machinery has been placed on the market recently. During the past few days the General Electric Co. reduced prices on machine tool motors from five to 10 per cent.

While nothing exceptionally large is being done in cranes, there appears to be a fair amount of buying of this class of equipment. The award of approximately $1,500,000 of coal handling equipment for the Virginian railway pier is expected within 10 days. Inquiry for cranes and hoists is coming out slowly but is expected to broaden considerably after the first of the year.

Machine Tool Inquiry Is Small and Scattered

NEW YORK, Nov. 21.—Buying of machine tools by the Pennsylvania railroad for its Altoona, Pa., plant is in progress. The Norfolk & Western and the Cornwall railroads have also made purchases including two 8-foot radial drills by the former and a 42-inch planer by the latter. The market generally is listless, with orders coming through slowly and new inquiry small and scattered. It appears that trading so far this month has not been as large as that of the corresponding period in October. Nevertheless prices continue strong. During the week the sale of government equipment held at the air reserve depot in Long Island City attracted a little interest among users. It is stated practically 90 per cent of the equipment at this auction went to used machinery

Crane Awards and Inquiries of the Week

Orders Placed

One 5-ton for the Guibert Steel Co., Pittsburgh, to the Barber-Foster Engineering Co., Cleveland.

Two 10-ton cranes with 56-foot span for the Pittsburgh Foundry & Machine Co. to the L. A. Green Rail & Machinery Co.

Three 20-ton locomotive cranes, 40-foot boom, for Boston & Maine, to Browning Co.

One 25-ton bucket handling crane for Ben Hur Erection Co., St. Louis, to Industrial Works.

One 40-ton locomotive crane, 70-foot boom, for Southern Pacific, for use in California, to Industrial Works.

One 10-ton monorail hoist for New York, New Haven & Hartford, to Shepard Electric Crane & Hoist Co.

One 7½-ton electric crane, 75-foot span, for Georgia Marble Co., Tate, Ga., to Shepard Electric Crane & Hoist Co.

One 10-ton 21-foot handpower crane, for the Atlantic Utilities Corp., Rio, N. Y., to the Reading Chain & Block Corp.

One pile driver for the Louisville & Nashville, to Industrial Works.

One 10-ton handpower crane, 39-foot, 6-inch span, for export, to New Jersey Foundry & Machine Co.

Two overhead cranes for shipment to Cuba, to Niles-Bement-Pond Co.

Two 1-ton hoists and one 1½-ton hoist for the Memphis, Tenn., plant of the American Car & Foundry Co., to Euclid Crane & Hoist Co.

One 10-ton electric overhead crane for installation in the gray iron foundry of the Anaconda Copper Mining Co., Anaconda, Mont., to Shaw Electric Crane Works.

Cranes for the Bartlett-Hayward Co., Baltimore, placed with unnamed builder.

Cranes for Belgo Paper Co. Ltd., Shawinigan Falls, Que., to unnamed builder.

One overhead crane for Thomson Machine Co., Belleville, N. J., to unnamed builder.

One 1¼-ton hoist for Lake Erie & Western, to Shepard Electric Crane & Hoist Co.

Orders Pending

One crane for the Union Steel Casting Co., Pittsburgh; bids being taken.

One each 10-ton and 15-ton pneumatic cranes and one 5-ton electric traveling crane for installation at Clairton, Pa., by-product plant, and one crane for the Weirton, W. Va., by-product plant; action to be taken by the Koppers Co. this week.

One 10-ton crane with 75-foot span for the Blaw-Knox Co., Pittsburgh; bids being taken for prompt delivery.

Cranes for the Michigan Steel Corp., First National Bank building, Detroit; definite inquiry to be issued later.

One each 3-ton and 5-ton cranes for the Pittsburgh Screw & Bolt Co., Pittsburgh; bids being taken.

One 10-ton crane for the Pittsburgh Knife & Forge Co., Coraopolis, Pa.; bids all in.

One 10-ton crane for the Cutler Steel Co., New Cumberland, W. Va.; bids all in.

One 5-ton crane for the Neely Nut & Bolt Co., Pittsburgh; action expected this week.

One 7½-ton crane for the Universal Steel Co., Bridgeville, Pa.; bids all in.

One 10-ton and 10 jib cranes for the Pennsylvania railroad, Freedom, Pa.; action expected soon.

One 3-ton, 33-foot span, for Altoona, Pa., plant of Pennsylvania railroad.

Cranes for new shops of Boston Elevated railway at Everett, Mass.; specifications to be issued in few weeks.

dealers. The General Electric Co., Schenectady, N. Y., recently reduced prices on reversing motor equipment for planers from five to 10 per cent, depending on the size.

A fair amount of crane buying is noted. The award of approximately $1,500,000 of coal handling equipment for the new pier of the Virginian railroad at Norfolk, Va., is expected to be announced within the next week or 10 days. Inquiry for electric cranes is coming out slowly, although there appears to be an improvement in demand for handpower cranes. One manufacturer reports that within the past week he has figured on 11 new inquiries for handpower cranes.

Single Tool Purchases Predominate

CLEVELAND, Nov. 21.—Machinery and shop equipment purchases continue small and limited to bare necessities. Users are not entering the market for any quantity and rarely does an order call for more than one machine. However, the volume of business is fair considering the fact November and December demand always is small. The automobile and allied industries are doing a little buying while the railroads are entering the market for small lots. Buying by the latter interests is somewhat disappointing in view of the fact the railroads in other sections of the country have placed some fair sized orders within recent weeks. But little prospective demand is in sight now, probably the largest of such prospective business being a list which is expected to be issued by the Pennsylvania railroad for its Columbus, O., shops. This list will not come out until after the first of the year. The Chesapeake & Ohio railroad also is expected to close on a list of tool requirements within the next few weeks.

One of the largest tool sales reported in this district for some time involves 17 machines. However, this sale is of little consequence in view of the fact the buying interest was a dealer. The sale was made by the Empire Machinery Exchange Co., Cleveland, to the Simmons Machinery Co., Albany, N. Y., and the equipment consisted of milling machines, turret lathes, drill presses, radial drills, etc. All of this equipment was moved from a defunct company near Detroit. Recent buyers of equipment include the Electric Auto Lite Corp., Toledo, O., the Chevrolet Motor Car Co., for its Toledo plant, and the Toledo Automatic Brush Machine Co.

Prospective buyers include the Union Chain & Mfg. Co., Sandusky, O., the Dayton Engineering Laboratories, Dayton, O., the American Rolling Mill Co., Middletown, O., and the Hot Steam Heater Co., Cleveland. The latter company has taken over the plant of the Post-Whitney Tractor Co., and among the equipment which it will require is an engine lathe. The American Rolling Mill Co. has a large plant expansion program in prospect and it is understood will buy considerable equipment.

Despite the fact equipment buying is not large industrial operations are steadily improving. There is no apparent letup in automobile demand and railroad work also is developing at a fair rate. A machinery dealer, who also acts as manufacturers' agent, during the past few weeks has closed a number of large orders of nuts and bolts, as well as stampings. The nuts and bolts are to be used on radiators while the stampings are to be used in automobile manufacturing. This continued activity tends well for the machine tool and shop equipment industry as it eventually will bring about a demand for tools and equipment for replacement purposes.

Machine tool prices are firm at the recently established levels despite the apparent dullness of the market. However, it is understood that secondhand machinery prices are not as firm as they were a few weeks ago due to the fact considerable surplus equipment, including government stocks, has been placed on the market. One large New York dealer in used machinery, who has been visiting the trade in this district, reports he has been able to purchase a considerable amount of surplus machinery in good condition at bargain prices. A large amount of this, he states, he has been able to dispose of before it reached his warehouse. Some classes of equipment, especially the heavier tools are scarce, and dealers have no difficulty in finding buyers for whatever of this class they have to offer.

Crane buying in this territory is small, although the crane manufacturers here report their business is much heavier than it was a few months ago. However, practically all the orders for cranes and similar equipment placed, are coming from other territories. A revival in buying of cranes is looked for after Jan. 1, when a number of plant expansion projects are scheduled to be started.

Orders for Tools More Numerous

PITTSBURGH, Nov. 21.—After a period of several months' duration when inquiries were the rule and orders the exception, several sellers of new machine tools report the receipt of several orders the past week, mostly for single items. Inquiries continue numerous although prices mainly are asked on one or two items; no particularly large lists as yet are being issued. These latter, it is thought, will not be circulated until 1923 appropriations are in sight. Sales of the week include a 25-inch drill, a 22-inch drill, 5-foot radial drill, motor driven 10-inch metal sawing machine, 16-inch tool room lathe, 24-inch motor driven shaper, one ½-inch by 8-foot plate bending roll and a 3 x 3-inch angle bending roll, with motors. The order for the shaper was placed before the coal strike of April 1 last but shipping instructions were held up until last week. During the interval the price had advanced $200. Buying is expected to commence this week or next on the Pennsylvania railroad's large list and on the Pittsburgh & Lake Erie's smaller list of six or eight items; in fact, it is reported that already verbal orders have been placed for the latter's 30-inch and 24-inch lathes. The Pittsburgh & Lake Erie railroad has a new inquiry out for a 42-inch vertical boring mill and the Chesapeake & Ohio railroad wants two lathes, including a turret lathe.

Sellers of used machinery are receiving a fair amount of business and predict that shortly a larger buying movement will ensue. Recent sales include a 24-inch slotter to a Detroit user, an 18-inch lathe and a 6-inch pipe machine. Interest is manifested in 42-inch open side planers but these are difficult to locate. The United States Radiator Corp. has been in the market for a cupola and other foundry equipment for its foundry additon at Corry, Pa., but so far no inquiries for machine tools have been received.

In connection with cranes, one or two contracts are awarded from week to week although most buyers continue to hold off. Further awards are expected this current week from the Koppers Co. as well as the Pennsylvania and Pittsburgh & Lake Erie railroads.

Current Buying Is Spotty

MILWAUKEE, Nov. 21.—A fair degree of activity, but an absence of distinct feature, continue to mark the trend of the market for metalworking machinery. Makers of milling machines, while not pressed, are able to keep their works operating at least at the point reached a month or two ago, as current buying, spotty as it is, makes up an aggregate that is satisfactory in view of the

dragging market of the past 18 to 24 months. Buying seems confined to necessities. In the automobile industry the busy season has passed and inspection is now under way which will determine to a considerable extent the needs to be placed between now and April 1. Gas engine shops have not felt the let-down to the same extent, and are working on contracts for winter and spring delivery which will keep them comfortably occupied for several months. Railroad shops are placing a little business but this is below expectations.

Improvement in Sales Is Noted

TORONTO, Ont., Nov. 21.—A successful sales campaign is being carried on by dealers and manufacturers of machine tools and shop equipment. While Canadian railways have not sent out any lists of size during the past week or two, they are buying equipment in a small way for replacement purposes. Buying generally is for replacement purposes and on new works account and as a consequence steady improvement is reported in the demand. Municipal governing bodies are preparing by-laws to be voted on at the coming municipal elections with regard to expenditures on waterworks plants, sewage plants, electric plants and many others for which large sums will be spent on machinery and equipment. In some quarters price increases have been announced. Canadian producers of equipment have followed announcements made by some American firms and have advanced prices on machinery and tools from 10 to 15 per cent. However, it still is reported some dealers are shading prices when a good order is in prospect. The increased industrial activities are having a stimulating effect on the demand for small tools.

The Levis County railway, Levis, Que., E. E. Weyman, manager, is asking for a 32-inch lathe, screw jack car hoist, shaper, vertical drill, double end emery grinder, combination circular saw, band saw, planer and a small lathe. Robert C. Sweatt, Ltd., Vancouver, B. C., is in the market for a set of crushing rolls, 16 x 36-inch, feed 1½-inch. The H. Mueller Mfg. Co., Ltd., Sarnia, Ont., will install additional equipment. The Sully Brass Foundry, Ltd., 2388 Dundas street west, Toronto, Ont., is installing equipment for the production of brass, bronze and aluminum castings. The Thunder Bay Paper Co., Port Arthur, Ont., is building a woodroom in connection with its plant in which will be installed two drum barkers, large motors, etc. The Dowsley Spring & Axle Co., Ltd., Chatham, Ont., is installing continuous forming fires and draw fires in its plant. W. H. Pendershot, 192 Robert street, Hamilton, Ont., is installing machinery and equipment for the manufacture of corrugated paper.

Presses Active in Otherwise Quiet Market

CHICAGO, Nov. 21.—With more than half the present month past, it appears certain that the total sales by machine tool dealers will be somewhat less than during October, although it is always possible for the final 10 days to see railroad buying sufficient to carry the total beyond expectations. Neither the Burlington railroad nor the Chicago, Milwaukee & St. Paul railroad has placed orders on pending inquiries and the Northwestern railroad, having bought all of its small recent inquiry, is not now in the market. Through shoppers at machinery warehouses and the consistent canvass by salesmen a fair aggregate of sales of single tools is being made, but no groups are being booked. The only feature in the present market is demand for punch presses, most of which are being taken by producers of automobile accessories. The presence of a number of accessory manufacturers in connection with a show at Chicago has stimulated this business during the past week. Prices on most lines of machine tools have been advanced to a higher level, but turret lathes have not yet been moved up and rumors are heard that manufacturers are about to advance their prices on this line.

Construction and Enterprise

Concise and Timely Business Building Opportunities from the Field of Industry

East of the Mississippi River

BANTAM, CONN.—The Trumbull-Vanderpoel Electric Mfg. Co. has increased its capital stock from $250,000 to $300,000.

BRIDGEPORT, CONN.—The Clark-Williams Co. has incorporated for $10,000. Arthur L. Clark is one of the incorporators.

BRIDGEPORT, CONN.—The Manufacturers Machine Tool & Supply Co., Inc., has been organized for $50,000. T. Leo Lalley, Fairfield, Conn., is one of the organizers.

BRIDGEPORT, Conn.—The Locomobile Co. has let the contract for a 1-story, 60 x 180-foot factory and plans to erect a 1-story, 40 x 200-foot additional factory.

DERBY, CONN.—The International Silver Co. has let the contract for a brick and steel, 1-story, 30 x 40-foot factory to cost $20,000.

FAIRFIELD, Conn.—S. Lowe & Sons, makers of hardware, have let the contract for a 2-story, 44 x 80-foot factory addition.

MERIDEN, CONN.—The branch plant here of the New Departure Mfg. Co., manufacturers of ball bearings, was put in operation recently.

NEW LONDON, CONN.—The New England Collapsible Tube Co. increased its capital stock from $40,000 to $250,000.

NEW HAVEN, Conn.—The Holmes Special Tool Co. has let the contract for a 1-story, 35 x 64-foot factory addition.

NEW HAVEN, CONN.—A new corporation has been organized here to manufacture the Reid Air Spring, a new invention of Edward Reid, who until recently has been employed by the Westinghouse Air Spring Co.

PLANTSVILLE, Conn.—The Blakeslee Forging Co. has let the contract for a 2-story, 40 x 42-foot building.

ROCKY HILL, CONN.—The Connecticut Foundry Co. has let the contract for a brick and reinforced concrete, 2-story, 30 x 70-foot building.

WATERBURY, CONN.—The Gulf Refining Co. plans to construct a new plant here.

WATERBURY, Conn.—The Connecticut Brass Co. is to erect a 1-story castings shop.

WASHINGTON—Plans have been completed by the Terminal Refrigerator & Warehouse Co. for a $1,000,000 coal storage plant. It is said there will be six acres of floor space.

AURORA, ILL.—The Aurora Shade Machinery Co., 32 South La Salle street, has been incorporated with $20,000 capital by William Lux, Frank F. Wright and Harry G. Griswell.

CHICAGO—Polishing wheels are to be manufactured by the Advance Wheel Mfg. Co., 125 West Illinois street, which has been incorporated for $10,000 by Ralph J. Garvey, James J. Manderscheid, and others.

CHICAGO—The Western Sheet Metal Works & Hardware Co., 1134 South Western avenue, has been incorporated by Sam Berkowitz, Henry

Berkowitz, and others with $3000 authorized capital.

CHICAGO—Metal window ventilators are to be manufactured by the Peters Metal Sales Co., 1130 Capital building, 159 North State street, which has been incorporated for $15,000 by Robert P. Rolle, room 650 at 38 South Dearborn street, Katherine Hiatt and Isabel Peters. Mr. Rollo is attorney for the company.

CHICAGO—To manufacture and deal in machines, machinery, etc., the Rieke Metal Products Corp. has been incorporated with 300 shares of no par value. Its headquarters are at 163 West Washington street and the incorporators are Walter J. Courtney, Theodore W. Rieke and Arthur Lorenz.

LA SALLE, Ill.—The Barnes Zinc Products Co., Eighth and Union streets, has been organized with 2000 shares of no par and $100,000 capital by Frank Page, C. B. O'Neil, and others.

ROCKFORD, Ill.—Contract has been let to the Ross P. Beckstrom Co. for a new addition to the Andrews Wire Works. The building permit calls for an 80 x 120-foot, 2-story building.

NEWPORT, Ky.—The Globe Iron Roofing & Corrugating Co. has been incorporated by W. N. Andrews, Joseph B. Andrews and Mary A. Graydon, with $20,000 capitalization.

HOULTON, Me.—The car and repair shops of the Bangor & Aroostook railroad were damaged by fire.

LEWISTON, ME.—Contract has been awarded McNalley Bldg. Co., Framingham, Mass., for a manufacturing building for the Bates Mfg. Co.

MADISON, ME.—The Great Northern Paper Co. is building a hydroelectric plant.

PORTLAND, Me.—The plant of the E. T. Burrowes Co., maker of wire screens, recently was damaged by fire.

PORTLAND, ME.—The McLain Co. has been incorporated with 1350 shares of capital stock to build machinery and make tools by Frank H. McLain, Clark B. Dunton and Henry L. Cheney.

SKOWHEGAN, ME.—The Somerset Machine Co. has been incorporated with $10,000 capital by Oscar Thompson, Wallace S. Clark and Frank C. Fellows, Brookline, Mass.

AMESBURY, MASS.—The Witham Body Co. has been incorporated with $100,000 capital to build automobile bodies, by Carleton C. Witham, Merrimac, Mass., and George F. Kelley and Octavius T. Howe, both of Boston.

BOSTON—The plant of the Hunt-Spiller Mfg. Co. was recently damaged by fire.

BOSTON—The Gordon Machine Co. has incorporated for $300,000. Donald MacNaughton is president.

BOSTON—The Morris Auto Radiator Corp. has incorporated for $10,000. Harry Cherney is president.

BOSTON—The Federal Metal Products Co. has been incorporated with 100 shares without par value by Charles E. Fay, Clifford H. Byrnes, North Cohasset, Mass., and Robert H. Davison.

BOSTON—The Katalite Co. of N. E., Inc., has been incorporated to build internal combustion motors and engines with $100,000 capital by Frank H. Woodman, Newton, Mass., Carl L. Mittell and Thomas H. G. Pierce.

BOSTON—The Plouff Corp. has been incorporated to build machinery with $116,665 capital stock by William E. Dixon, Somerville, Mass., Frederic H. Plouff, Newton, Mass., and Austin N. Barber, East Braintree, Mass.

BOSTON—The Atlantic Pipe & Supply Co. has been incorporated to make castings with $21,000 capital by Samuel Hurwitz, Somerville, Mass., Abraham J. Charest, Medford, Mass., and John D. Sillen, East Milton, Mass.

FAIRHAVEN, Mass.—The Perry Laundry Machinery Co. has been incorporated with $100,000 capital by Emanuel J. Perry, Frank Vera and Frank Vetorino, all of New Bedford, Mass.

FALL RIVER, MASS.—Contract has been awarded for an addition for the Sagamore Mfg. Co.

GARDNER, Mass.—The Standard Specialty Works, screw machine products, is erecting a 1-story, 40 x 100-foot factory.

NORTHAMPTON, MASS.—The Universal Garage Corp. has been incorporated with $100,000 capital to build metal garages by Joseph L. Baltrun, Willcord W. Cote and Eli H. Cote.

SOUTH BOSTON, Mass.—The pattern shop of the Hunt-Spiller Mfg. Corp. was damaged by fire.

SOUTH BOSTON, Mass.—The Edison Electric Illuminating Co., Boston, has let the contract for a 1-story and basement, 150 x 150-foot boiler house.

TAUNTON, Mass.—The Weir Stove Co. has let the contract for a 1-story, 48 x 64 and 40 x 68-foot additions.

WESTFIELD, MASS.—The Queen B. Radio Co. has incorporated for $25,000. Selden B. Sanford is president.

WORCESTER, Mass.—Sleeper & Hartley,

Warehouse Steel Prices

Quotations in Cents Per Pound at Leading Market Centers

STEEL BARS

Boston	3.065c
Buffalo	3.10c
Chicago	2.80c
Cincinnati	2.95c to 3.10c
Cleveland	2.91c
Detroit	3.00c
New York	3.04c
Philadelphia	3.025c
San Francisco	3.40c
Seattle	3.60c
St. Louis	2.90c
St. Paul	3.05c
Los Angeles	3.50c

IRON BARS

Boston	3.165c
Buffalo	3.10c
Chicago	2.80c
Cincinnati	3.10c
Detroit	3.00c
New York	3.04c
Philadelphia	3.025c
St. Louis	2.90c

SHAPES, STRUCTURAL

Boston	3.165c
Buffalo	3.20c
Chicago	2.90c
Cincinnati	3.05c to 3.20c
Cleveland	3.01c
Detroit	3.10c
New York	3.14c
Philadelphia	3.125c
San Francisco	3.40c
Seattle	3.60c
St. Louis	3.00c
St. Paul	3.15c
Los Angeles	3.60c

PLATES

Boston	3.165c
Boston 3/16-inch	3.04c
Buffalo	3.20c
Chicago	2.90c
Cincinnati	2.95c to 3.20c
Cleveland	3.01c
Detroit	3.10c
New York	3.14c
Philadelphia	3.125c
Philadelphia, 1/2-inch	3.33c
San Francisco	3.50c
Seattle	3.60c
St. Louis	3.00c
St. Paul	3.15c
Los Angeles	3.75c

NO. 10 BLUE ANNEALED SHEETS

Boston, 1/8-inch	4.15c
Buffalo	4.05c
Chicago	4.00c
Cincinnati	3.75c to 4.00c
Cleveland	3.70c to 3.76c
Detroit	3.95c
New York	4.19c
Philadelphia	3.85c
San Francisco	4.50c
Seattle	4.85c
St. Louis	4.10c
St. Paul	4.25c
Los Angeles	4.70c

NO. 28 BLACK SHEETS

Boston	5.40c
Buffalo	4.85c
Chicago	4.85c
Cincinnati	4.00c
Cleveland	4.40c
Detroit	4.90c
New York	4.90c
Philadelphia	4.60c
San Francisco	6.05c
Seattle	5.85c
St. Louis	4.95c
St. Paul	5.10c
Los Angeles	6.10c

NO. 28 GALVANIZED SHEETS

Boston	6.40c
Buffalo	5.85c
Chicago	5.85c
Cincinnati	5.20c
Cleveland	5.40c
Detroit	5.90c
New York	5.90c
Philadelphia	5.75c
San Francisco	6.90c
Seattle	6.85c
St. Louis	5.95c
Los Angeles	6.90c

BANDS

Boston	4.25c
Buffalo	3.90c
Chicago	3.55c
Cincinnati	3.70c to 3.85c
Cleveland	3.71c
Detroit	3.80c
New York	3.84c
Philadelphia	3.825c
San Francisco	4.05c
Seattle	4.35c
Los Angeles	4.40c

HOOPS

Boston	4.75c
Buffalo	4.10c
Cleveland	3.71c
Detroit	4.20c
New York	4.39c
Philadelphia	4.25c
Seattle	5.00c

COLD ROLLED SHAFTING

Boston (rounds)	4.00c
Boston (shapes)	4.50c
Buffalo (rounds)	3.95c
Buffalo (shapes)	4.45c
Chicago (rounds)	3.80c
Chicago (shapes)	4.30c
Cincinnati (rounds)	3.75c
Cleveland (rounds)	3.75c
Cleveland (shapes)	4.25c
Detroit (rounds)	3.80c
Detroit (shapes)	4.30c
New York	3.90c
New York (shapes)	4.40c
Philadelphia (rounds)	3.85c
Philadelphia (shapes)	4.35c
San Francisco	5.00c
Seattle	5.25c
Los Angeles	5.10c

Bourne-Fuller Service

includes immediate shipment of all Iron and Steel materials from Cleveland and Cincinnati

Warehouses

If you are not receiving our Stock-list we shall be glad to send it to you regularly upon request.

Upson Works

Open Hearth Steel Bars for special uses. Also a complete line of Bolts and Nuts. Prompt Shipments.

THE
BOURNE-FULLER CO.
Iron, Steel
Pig Iron
Coke

CLEVELAND

New York **Chicago** **Detroit**
San Francisco
Cincinnati

Inc., has let the contract for a 1-story, 20 x 50-foot factory addition.

WORCESTER, Mass.—The Parker Wire Goods Co. has let the contract for a 1-story, 120 x 300-foot factory on the site of the former Star foundry.

PATTERSON, N. J.—McNab & Harlin Mfg. Co., manufacturer of pipe, has recently disposed of a bond issue of $750,000, a portion of the proceeds to be used for plant additions.

ALBANY, N. Y.—The Industrial Laboratories & Products Corp., with $150,000 capital authorized, has been incorporated by A. K. Vrooman, A. W. Twitchell and W. J. Reddy.

AUBURN, N. Y.—To manufacture self-propelled air vehicles and automobiles, Henderson & Lathrop have been incorporated for $60,000 by S. T. Henderson, L. B. Lathrop and V. L. Thayer.

BROOKLYN—The Johnson Gas Saver & Carbon Eliminator Co. has been incorporated by E. Johnson, J. Johnson and Solon Gillama.

BROOKLYN—The Eastern Electrical Chemical Co. has been incorporated for $20,000 by D. Goldk'ang, F. Paul and M. Loris, with M. D. Bohrar, 154 Nassau street, attorney.

BROOKLYN—The Pavo Machinery Co. has been chartered for $80,000 with I. B. McGirr, O. Heyman and J. A. Voice, with Stern & Reubens, 149 Broadway, as attorney.

BROOKLYN—Plumbing specialties are to be manufactured by the Humboldt Specialties Corp., incorporated recently with $20,000 authorized capital, by P. M. Bloom and M. Weinstock with N. Tolk, 58 Essex street, as attorney.

BROOKLYN—With $5000 initial capitalization, the Gottlieb Iron Works has been chartered with D. Gottlieb, B. Stimel and J. F. Newman, with Mr. Newman, 291 Broadway, one of the attorneys.

BUFFALO—The Fox Waste Products Corp., to deal in scrap metals, has been incorporated by H. M. Fox, I. S. Rubin and B. Lavin, for $10,000.

DUNKIRK, N. Y.—The Atlas Steel Corp., which is to expand its plants, has been authorized to issue 65,000 shares of preferred stock $100 each and 100,000 shares of no par common.

JAMESTOWN, N. Y.—To manufacture motors, Harry A. Dahlgren has been incorporated for $25,000 by H. A. Dahlgren, G. L. Dahlgren and G. M. Cowan.

NEW YORK—The Urania Radio Mfg. Co. has been incorporated for $15,000 by M. Chess, R. H. Ernst and S. L. Chess, 38 Park Row.

NEW YORK—The H. R. Kuhnhardt Jr. Corp., to refine metals, has been incorporated at $400,000 by W. W. Wait, E. Armstrong and L. Debrigard, with M. Schenkman, 56 Pine street, attorney.

NEW YORK—The Royal Distributing Co., metals and chemicals, has been incorporated for $25,000 by W. A. Moore, A. H. Porter and F. D. Bristley, with Frost, Watson & Sharp, Albany, N. Y., as attorneys.

NEW YORK—Capitalized at $35,000 the High Speed Micrometer Co. has been incorporated by C. B. Fields, G. G. Fischbein and H. A. Singer, with M. Eichner, 1545 Broadway, as attorney.

NEW YORK—The Miller-Harmon Corp. has been incorporated for $100,000 to deal in machinery, motors, etc., by P. Deschere, L. Weinberg and G. Herrmana, with S. L. Samuels, 80 Broadway, attorney.

NEW YORK—To deal in iron and steel Edward F. Maher has been incorporated for $25,000 by E. F. Maher, J. C. Donoghue and J. C. Canning. Speir & Bartlett, 52 Wall street, are attorney for the corporation.

NEW YORK—With $180,000 capital authorized, the Apex Weather Strip & Screen Co. has been incorporated by H. C. Partridge, M. C. Walsh and G. Johnston, with W. H. Wood, 44 Court street, Brooklyn, as attorney.

NEW YORK—Scrap iron and steel are to be handled by the Iron Builders Corp. which has been chartered for $40,000 by W. A. Young, E. M. Klatt, and others. Mr. Young is the attorney for the company with offices at 115 Broadway.

NEW YORK—Creditors here of the Memphis Gas & Electric Co. have taken over the properties and have pledged to spend $2,000,000 improvements within the next 18 months. H. C. Abell, New York, will head the new organization which expects to take over operations Jan. 1.

SYRACUSE, N. Y.—Electrical fixtures are to be manufactured by Oakley Lowe, incorporated for $25,000 by H. D. Oakley and D. E. Lewis.

SYRACUSE, N. Y.—The plant of the New Process Gear Corp. recently purchased by T. W. Warner, Toledo, O., vice president of Durant Motors, Inc., and associates, will be enlarged. Plans are to be made public shortly.

CINCINNATI—The Low Gasoline Alarm Co. has been incorporated with $10,000 authorized capitalization by Ralph B. Goodrich, Norwood J. Utter, William H. Morris, O. W. Bennett and G. Glandorff.

CLEVELAND—Final legislation for the proposed $1,000,000 pier at the foot of East Third

German Exports of Iron and Steel Show Decline

LONDON, Nov. 9.—German iron and steel exports for August were 198,408 metric tons, a decline of 13,957 tons over July. With the exception of February, the exports for August are the lowest recorded during the year. Since March the exports have been declining and the imports increasing, with the result that the imports for August exceeded the exports by 40,223 tons. The imports for August were 238,631 tons.

Pig iron imports in August were 24,989 tons, together with 53,891 tons of scrap, 26,589 tons of blooms, billets, etc., and 94,905 tons of bars. As compared with these figures the statistics for August show that 6851 tons of pig iron were exported together with 14,224 tons of scrap, 39,796 tons of bars, 14,425 tons of plates, 14,671 tons of wire and 28,573 tons of rails.

The exports of machinery in August were 42,850 tons, compared with 36,281 tons in July and 41,527 tons in June. The imports of machinery in August were only 529 tons compared with 776 tons in July. The August exports of machinery are valued at 4,081,054,000 marks ($1,600,000). Details of German exports for the first eight months are given in the accompanying table.

In Metric Tons of 2205 Pounds

	January	February	March	April	May	June	July	August
Pig iron, ferroalloys and scrap	22,064	14,804	24,830	19,992	11,714	11,813	11,590	21,781
Cast iron pipe	3,043	2,310	2,992	4,170	4,954	4,460	5,006	2,562
Rolls	1,997	847	2,076	898	540	475	882	1,039
Cast machine parts	667	632	722	601	360	294	152	265
Other castings	7,614	5,337	5,854	6,930	7,604	6,323	8,730	7,195
Blooms, billets, sheet bars	4,381	2,287	3,173	3,149	2,632	3,073	8,848	9,840
Bars and bands	55,635	40,751	42,877	37,435	40,787	34,387	38,981	39,796
Plates and sheets	24,184	16,478	17,687	17,737	22,927	20,075	18,881	14,425
Tin plate and galvanized sheets	2,614	2,135	2,937	2,335	2,357	2,180	2,342	1,412
Wire, rolled and drawn	11,059	12,797	11,267	12,225	12,431	16,103	13,278	14,671
Pipe	11,214	9,273	10,239	12,170	13,649	15,741	9,329	6,338
Rails and track fastenings	25,955	21,182	30,046	22,907	33,560	34,638	30,081	30,550
Wheels and tires	4,801	3,105	3,786	4,441	5,606	3,537	6,736	5,525
Forgings	10,544	8,641	11,843	11,427	8,341	14,172	12,850	9,891
Bridge and structural steel	4,116	4,150	5,462	5,348	4,181	5,367	5,135	2,954
Boilers	1,779	1,216	2,673	2,708	2,378	2,891	3,398	2,933
Anchors, hammers, etc	674	364	522	543	472	481	536	425
Agricultural implements	3,331	2,498	3,406	3,551	3,277	2,890	3,622	3,022
Tools	3,416	2,839	3,435	3,701	3,351	3,392	3,806	3,395
Screws, bolts, nuts, etc	2,948	2,424	3,119	3,021	2,612	2,710	2,347	1,974
Axles	246	190	258	398	312	327	229	202
Railway and auto springs	151	63	110	633	502	634	807	419
Wire rope	3,605	4,704	5,969	778	817	1,147	979	1,138
Other wire products	631	669	736	4,917	5,961	5,269	4,610	3,498
Wire nails	4,151	3,947	4,985	4,527	5,578	7,325	5,599	4,266
House hardware	3,425	2,765	3,879	4,199	3,633	3,343	3,285	2,480
Chain	622	572	582	825	381	623	786	634
Miscellaneous	6,873	5,729	6,515	9,120	8,515	9,550	9,571	5,778
	221,743	172,709	211,980	200,677	209,432	213,220	212,397	198,408

Morgenblatt

Münchner Neueste Nachrichten

Handels- und Industrie-Zeitung, Alpine und Sport-Zeitung, Theater- und Kunst-Chronik

Täglich zwei Ausgaben

Süddeutsche Zeitung

Donnerstag, 12. Januar 1922 Knorr & ... 75. Jahrgang Nr. 14

Weltproduktion in Roheisen und Rohstahl 1921

Münchner Neueste Nachrichten, Munich, with a circulation of 160,000, is by far the most widely circulated journal in South Germany. It is read by those connected with industry and commerce, and enjoys a high reputation for trustworthiness of its reports.

400 Newspapers Regularly Quote

IRON TRADE REVIEW

CLEVELAND

The international reputation and the World-wide circulation of the IRON TRADE REVIEW is the result of year after year of unfailing Editorial accuracy and reliability.

PROOF-

THE IRON TRADE REVIEW

"The Most Widely Quoted Trade Paper In The World"

street to be built by the Detroit-Cleveland Navigation Co. is being prepared. The city council will be asked to approve the lease.

COLUMBUS, O.—The Redding Valve Co. has been incorporated for $100,000 by J. R. Bradford, E. K. Drumm and J. A. Drumm.

COLUMBUS, O.—Construction work on the $100,000 power house and laundry at the Girls Industrial school, Deleware, has been ordered as an emergency measure.

COLUMBUS, O.—According to H. L. MacAyeal, state welfare director, the legislature will be asked for an appropriation for rebuilding the auto tag shop and planing mill of the Ohio penitentiary.

DAYTON, O.—The Kelemet Cored Bar Co., capitalized at $20,000, has been incorporated by John R. Brownell, G. Clifford Shroyer, Henry G. Pagani, O. B. Brown and A. S. Frank.

SPRINGFIELD, O.—The building housing the Fairbanks Co.'s stock room, pattern shop and timekeeper's office was damaged Nov. 13. The building also was occupied by the Indianapolis Frog & Switch Co. The loss to both companies was $45,000.

BETHLEHEM, Pa.—Fire recently badly damaged the woodworking plant of the Charles Kurtz Co., the loss being estimated at $1,000,000. While details have not been worked out, it is understood the plant will be rebuilt.

BETHLEHEM, Pa.—Work will be started at once on a $25,000 garage and repair station for the Hart Auto Co.

GIRARD, PA.—The Girard Model Works, Inc., has been incorporated with $100,000 capital stock to manufacture wire shapes, small springs, etc., by S. L. Connell, John Detrick

PHILADELPHIA—Plans have been completed for a new plant, to be erected at Main and Sumac streets, for Charles E. Farrington.

PHILADELPHIA—The Abrasive Co. has awarded a general contract for the erection of a factory building at Tacony and Fraley streets.

PHILADELPHIA—Contract for the erection

Iron and Steel Prices

Iron Ore

LAKE SUPERIOR ORES
Per Gross Ton Lower Lake Ports

Old range Bessemer, 55 per cent iron	$5.95
Mesabi Bessemer, 55 per cent iron	5.70
Old Range nonbessemer, 51½ per cent iron	5.20
Mesabi nonbessemer, 51½ per cent iron	5.05

EASTERN LOCAL ORES
Cents per unit delivered at Eastern Pennsylvania and New Jersey furnaces

Foundry and basic, 53 to 63 per cent	9.50 to 10.50

FOREIGN IRON ORE
Cents per unit, c.i.f. Atlantic ports.

Spanish low phosphorus, 52 to 54 per cent	9.00 to 10.00
Algerian low phosphorus, 52 to 54 per cent	10.00 to 11.00
Swedish and Norwegian low phosphorus, 68 per cent	11.00 to 11.50
Swedish foundry or basic, 68 per cent	9.00 to 9.50
Spanish foundry or basic, 52 to 54 per cent	8.00 to 9.00

Manganese Ore

Brazilian, minimum 47 per cent c.i.f. Atlantic ports, 29 cents per unit, nominal. (Equivalent to $24.67 per gross ton or 51.4 cents per unit, duty paid, tidewater.)

Indian 48 to 50 per cent c.i.f. Atlantic ports, nominal.

Caucasian, 52 per cent, c.i.f. Atlantic ports, nominal.

Fluor Spar

85 and 5% grade

Washed gravel, Kentucky and Illinois mines, per ton	$21.50

Rivets

Structural rivets, Pittsburgh	3.00c to 3.15c
Boiler rivets, Pittsburgh	3.10c to 3.25c
Rivets, ⅞-inch and smaller	65 off to 65-5 off

Nuts and Bolts

NUTS
(Up to 1¼ and 1½ inches inclusive)

Hot pressed square or hexagon blank or tapped	$3.25 to $3.50 off list
Cold punched square or hexagon blank or tapped	$3.25 to $3.50 off list
Cold punched semifinished hexagon nuts ⅝-inch and larger	70-10-2½ off
Cold punched semifinished hexagon nuts ⅞-inch and smaller	70-10-5 off
Case hardened, finished, hexagon	65-5 off

Price f.o.b. Pittsburgh, Packages of 50.

CARRIAGE BOLTS
⅜ x 6 inches, smaller and shorter

Rolled thread	50-10-5 off
Cut thread	50 off
Larger and longer	50 off

MACHINE BOLTS
(⅜ x 4 inches, hot pressed nuts)

Rolled thread	60-5 off
Cut thread	50-10 off
Larger and longer	50-10 off

(⅜ x 4 inches, cold punched nuts)

Cut thread	45 off
Larger and longer	45 off
Lag screws	50-10 to 60-5 off
Plow bolts Nos. 1, 2 and 3 heads	50-5 off
Tap bolts	30 off
Bolt ends with hot pressed nuts	50-10 off
Bolt ends with cold punched nuts	45 off
Blank bolts	50-10 off
Rough stud bolts with nuts	45 off

Steel Pipe

Pittsburgh basing discounts, jobbers, carloads

	Black	Galvanized
Butt Weld		
⅛-inch	49	23½
¼ and ⅜-inch	55	29½
½-inch	60	46½
¾-inch	64	52½
1 to 3-inch	66	54½
Lap Weld		
2-inch	59	47½
2½ to 6-inch	63	51½
7 to 8-inch	60	47½
9 to 12-inch	59	46½
REAMED AND DRIFTED		
Butt Weld		
1 to 3-inch	64	52½
Lap Weld		
2-inch	57	45½
2½ to 6-inch	61	49½
EXTRA STRONG—PLAIN ENDS		
Butt Weld		
⅛-inch	45	28½
¼ and ⅜-inch	51	34½
½-inch	57	46½
¾-inch	62	51½
1 to 1½-inch	64	53½
2 to 3-inch	65	54½
Lap Weld		
2-inch	57	46½
2½ to 4-inch	61	50½
4½ to 6-inch	60	49½
7 to 8-inch	56	43½
9 to 12-inch	50	37½
DOUBLE EXTRA STRONG		
Butt Weld		
½-inch	46	36½
¾ to 1½-inch	49	39½
2 to 2½-inch	51	41½
Lap Weld		
2-inch	45	36½
2½ to 4-inch	47	38½
4½ to 6-inch	46	37½
7 to 8-inch	42	29½

Wrought Iron Pipe

Pittsburgh basing discounts, jobbers, carloads

	Black	Galvanized
THREADS AND COUPLINGS		
Butt Weld		
⅛ and ¼-inch	+ 7	+33
⅜-inch	26	8
½-inch	32	17
¾-inch	34	19
1 to 1½-inch		
Lap Weld		
1¼ and 1½-inch	Upon application	
2-inch	29	15
2½ to 6-inch	32	19
7 to 12-inch	30	17
PLUGGED AND REAMED		
Two points less than above		
EXTRA STRONG, PLAIN ENDS		
Butt Weld		
¼ and ⅜-inch	+15	+48
½-inch	25	13
¾-inch	32	18
1 to 1½-inch	34	20
Lap Weld		
2-inch	30	17
2½ to 4-inch	31	21
4½ to 6-inch	32	20
7 to 8-inch	25	13
9 to 12-inch	20	8

DOUBLE EXTRA STRONG		
Butt Weld		
½-inch	+37½	+49½
¾-inch	+18	+30
1-inch	+34	+46
1¼-inch	+18	+30
1½-inch	+17	+29
Lap Weld		
2 and 2½-inch	+ 3	+15
3 to 4-inch	2	+ 7
4½ to 6-inch	1	+ 7
8-inch	+ 4	+ 8

Boiler Tubes

L. C. L. discounts. C. L. 4 points larger

STEEL	
1¾-inch	17½
2 and 2¼-inch	32
2½ to 3-inch	43
3¼ to 4-inch	48
CHARCOAL IRON	
1½-inch	+11
1¾-inch	+ 1
2 and 2¼-inch	9
2½ to 3-inch	14
3¼ to 4½-inch	16
SEAMLESS COLD DRAWN	
1-inch	51
1¼ and 1½-inch	43
1¾-inch	27
2 and 2¼-inch	30
2½ and 2¾-inch	34
3-inch	38
3¼ to 4-inch	43
4½ and 5-inch	35
SEAMLESS HOT ROLLED	
3-inch	40
3¼ to 4-inch	45

SEAMLESS STEEL MERCHANT BOILER TUBES

Extras:

Add $8 per net ton for more than four gages heavier than standard and add 10 per cent to theoretical weight.

Add 5 per cent for lengths over 24 feet and not over 26 feet.

Smaller tubes than 1-inch and lighter than standard gage to be sold at mechanical tubing list and discount.

Intermediate sizes and gages not listed above take price of next larger outside diameter and heavier gage.

SEAMLESS STEEL MECHANICAL TUBING

Base Discounts

Carbon, 0.10 to 0.20 per cent	85 off
Carbon, 0.30 to 0.40 per cent	83 off
Carbon, 0.40 to 0.50 per cent	82 off

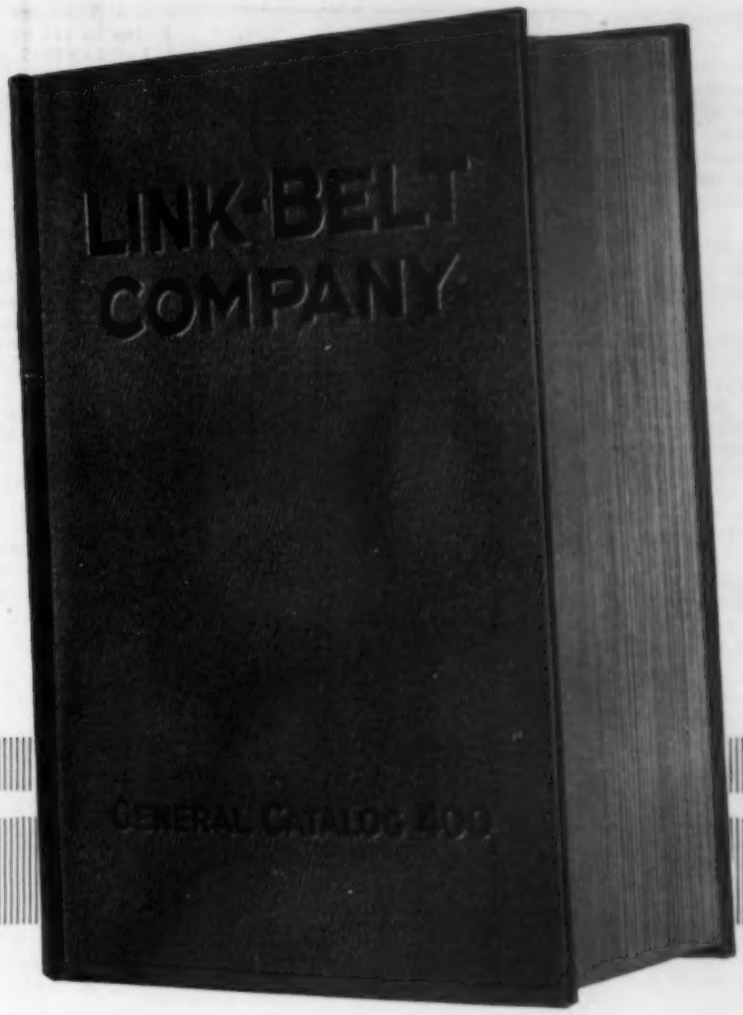
Plus usual differentials and extras for cutting.

SEAMLESS STEEL LOCOMOTIVE AND SUPERHEATER TUBES

Net prices per foot, f.o.b. Pittsburgh

Outside diameter	Gage	Price
2-inch	12-gage	14c
2-inch	11-gage	15c
2-inch	10-gage	16c
2¼-inch	12-gage	16c
2¼-inch	11-gage	17c
2¼-inch	10-gage	19c
3-inch	7-gage	34c
1½-inch	9-gage	13¾c
5½-inch	9-gage	53c
5½-inch	9-gage	55c

Plus usual extras for forming and for long lengths.



NOW READY FOR DISTRIBUTION

THE new Link-Belt General Catalog No. 400 contains 832 pages of practical mechanical information on elevating, conveying and power transmitting machinery and accessories — c h a i n s, sprocket wheels, buckets, gears, screw conveyors; in fact, it combines the complete Link-Belt Company products with those of our H. W. Caldwell & Son Co. plant.

It is the most complete catalog we have ever issued. Use it as your guide in preparing plans for your material handling and power transmission equipment.

Engineers, architects, superintendents, purchasing agents, and those responsible for production, should have a copy. We shall be pleased to send the book to the right man in your organization, if it can be used to our m u t u a l advantage. Address our nearest office, on your letterhead, giving your name and position.

LINK-BELT COMPANY 1062

PHILADELPHIA

New York . . . Woolworth Bldg.
Boston 9 . . . . 49 Federal St.
Pittsburgh . . . . 1501 Park Bldg.
St. Louis . . Central Nat'l Bank Bldg.
Buffalo . . . . 847 Ellicott Square

CHICAGO

Wilkes-Barre . . 2d Nat'l Bank Bldg.
Huntington, W. Va. Robson-Prichard Bldg.
Cleveland . . . 429 Kirby Bldg.
Detroit . . . . 4210 Woodward Ave.
Kansas City, Mo . 306 Elmhurst Bldg

Seattle . . . . 820 First Ave., S.
Portland, Ore. . . . 101 First St.
San Francisco . . . 188 Second St.
Los Angeles . . 163 N. Los Angeles St.
Denver, Lindrooth, Shubart & Co., Boston Bldg.

INDIANAPOLIS

Louisville, Ky., Frederick Webb, Starks Bldg.
New Orleans, C. O. Hinz, 604 Carondelet Bldg.
Birmingham, Ala.,
S. L. Morrow, 720 Brown-Marx Bldg.

Canadian Link-Belt Co., Ltd., Toronto and Montreal H.W. CALDWELL & SON CO., CHICAGO NEW YORK, Woolworth Bldg. DALLAS, TEXAS, 708 Main St.

LINK-BELT

of a small machine shop for A. Gabler, has been awarded to Walter Einwechter.

PHILADELPHIA—Work will start shortly on the erection of an 8-story addition to the plant of the Ketterlinus Lithographic Mfg. Co. Plans were prepared by the Ballinger Co.

PHILADELPHIA—William Steele & Sons Co. has been awarded the contract for the erection of a $25,000 warehouse addition for the American Insulation Co.

PHILADELPHIA—A $10,000 warehouse will be erected by Charles Crowley, the general contract being awarded to Albert H. Moorshead, Philadelphia.

PHILADELPHIA—A $1,000,000 15-story warehouse will be erected at 1312-14 Chestnut street, for the Cunningham Piano Co. Plans are being prepared by Andrew J. Sauer & Co., architects.

PHILADELPHIA—A $120,000 warehouse addition will be erected by the Miller North Broad Storage Co. The building will be 7-stories high, of reinforced concrete. The N. Gill Construction Co. has been awarded the general contract.

PITTSBURGH—The Guibert Steel Co. has been incorporated with $200,000 capital stock by O. E. Guibert, Crafton, Pa., F. W. Guibert and S. R. Bachtel.

SCOTTDALE, PA.—The Fayette Foundry & Machine Co. has been incorporated with $25,000 capital stock by M. J. Conlon, E. J. Connare and E. D. Finnerty.

SCRANTON, PA.—The Berwick Township Adams Power Co. has been incorporated with $5000 capital stock by E. H. Ramsbotham, F. Heibokel and G. L. Badcomen.

SCRANTON, PA.—The Germany Township Adams Power Co. has been incorporated with $5000 capital stock by E. H. Ramsbotham, F. Heibokel and G. L. Badcomen.

SPRINGDALE, PA.—The Pressed Metal Co. has been incorporated wiht $100,000 capital stock by George A. Uhlinger, H. J. Bechman and W. N. Harvey.

PHILLIPSDALE, R. I.—The Phillips Wire Co. has let the contract for a brick and reinforced concrete, 1-story, 40 x 60-foot power house addition.

CHATTANOOGA, Tenn.—Fire recently destroyed the main plant of the Continental Machinery Co. here with a loss of $200,000. It is reported the plant will not be rebuilt.

CHARLESTON, W. VA.—The Higginbotham & Jones Construction Co. has been awarded the contract for the first of the series of 12,000-ton units for the Evans Lead Co., a new corporation. S. M. Evans is president and general manager of the lead company.

DUNDON, W. Va.—J. C. Bradley, president of the Elk River Coal & Lumber Co., has awarded a contract for six steel bridges for its subsidiary the Buffalo Creek & Gauley railroad. The contract went to the Phoenix Bridge Co., Phoenixville, Pa.

PARKERSBURG, W. Va.—The board of commerce has announced that the Blackwood Electric Steel Foundry Co., Sandusky, O., will locate in Parkersburg. Work on the construction of a large building will start at once.

APPLETON, Wis.—A repairshop and service addition, 50 x 50 feet, will be erected by the Milhaupt Spring & Auto Co., manufacturing vehicle springs and doing general motor overhauling and repair work.

CRANDON, Wis.—A 4-acre site has been purchased here by Forest H. Hines, formerly of the Stevens Lumber Co., Rhinelander, Wis., as the site for a sawmill and planing mill to cost $40,000.

EAU CLAIRE, Wis.—Gages for automobile gas tanks and reservoirs will be manufactured by the Automobile Gasoline Gauge Mfg. Co., a $20,000 corporation organized here by C. Knobloch, E. V. Kuehl and V. Streets.

MANITOWOC, Wis.—Contracts have been let by the Aluminum Specialty Co. for a 3-story factory and storage addition, 32 x 150 feet, costing $37,000 without equipment.

MILWAUKEE—The Wisconsin Cylinder Grinding Co. has been incorporated here with a capital stock of $15,000 to specialize in gas engine work on automobiles, trucks, tractors, engines, etc.

MILWAUKEE—The Phoenix Light Co., 525 Market street, manufacturing electric light fixtures, portable lamps, etc., is issuing $125,000 in preferred stock to finance enlargement of its plant and business.

MILWAUKEE—Articles of incorporation have been filed by the Cole Machinery Co. with $25,000 capital stock, authorized to manufacture and deal in machinery of all descriptions. The incorporators are H. J. Cole, J. E. Birkett and L. Cole.

MILWAUKEE.—The Federal Engineering Co. is in charge of plant construction and equipment of a $75,000 dairy products and cold storage plant for the Waukesha Milk Co. at 342-346 Sixth street. Bids are being taken.

MILWAUKEE.—The capital stock of the Milwaukee Motor Products Co., 760-780 Thirtieth street, has been increased from $200,000 to $350,000. The concern manufactured timers and other ignition specialties and automobile accessories and is considering plant enlargement.

NEENAH, Wis.—A public garage and repair shop, 50 x 175 feet, costing $25,000, will be erected at 214-218 South Commercial street by the Jaeger-Dowling Auto Co. Architect Earl F. Miller, Inc., Appleton, Wis., has completed plans and is taking bids.

PESHTIGO, Wis.—A new department to manufacture power boats is being established by Thompson Bros., who are erecting a 3-story addition, 96 x 160 feet.

Business Changes

THE Gibb Instrument Co., manufacturer of electric welding equipment will remove its plant and offices from Detroit to Bay City, Mich., Dec. 1.

* * *

The Roger J. Adams & Co., Newark, N. J., on Jan. 1, will open a branch in Los Angeles to handle contractor's equipment and building materials.

* * *

Harry B. Davis, Portland, Oreg., has incorporated as the H. B. Davis Iron & Steel Co., with office and warehouse at 388-390 Front street. His office formerly was at 389 Water street.

* * *

Cleveland offices of the American Bridge Co. have been moved from 527 Guardian building to 1509 Guardian building. Frank D. Rideout continues contracting engineer in charge.

New Trade Publications

WELDED PIPE JOINTS—The Steere Engineering Co., Detroit, recently published a pamphlet illustrating and describing a new sleeve on gas, steam, water and air pipes which it is claimed simplifies the process of welding the pipe joints. The pipe with the new sleeve is now being made in sizes up to 36 inches.

CRAWLER CRANE—A new crawler crane is illustrated and described in a folder issued by the Link-Belt Co., Chicago. According to the folder the crane can operate with hook-block, grab bucket, drag line bucket, skimmer bucket, steam shovel attachment, electric lifting magnet, wood grapple or pile driver attachment. A clearance diagram of the crane also is shown.

STEEL STRUCTURES—A 70-page booklet has been issued by McClintic-Marshall Co., Pittsburgh, illustrating a number of structures erected with steel furnished by this company. Photographs are shown of warehouses, mill and factory buildings, office and store buildings, power houses, machine shops and foundries, airship hangars, canal locks and other steel structures.

GEAR GRINDING—The Lees-Bradner Co., Cleveland, recently has issued an illustrated booklet describing and illustrating a new type of machine designed to grind transmission gears for automobiles. The development of the grinder, method of operation, method of testing the gears after they have been ground are described as well as the principles of design underlying a machine for gear grinding.

AUGER BITS—A 40-page booklet listing its various products has recently been issued by the W. A. Ives Mfg. Co., Wallingford, Conn. This company has been in operation continuously since 1830 producing auger bits. The booklet is well illustrated and shows some of the operations required in making bits, saws, screw drivers, chisels and other tools manufactured by the company.

THERMOSTATIC MOTOR CONTROL—A 4-page illustrated folder has been published by the Minneapolis Heat Regulator Co., Minneapolis, which gives a description of a new type of switch for thermostatic control of motors, electric heating units and other electrical circuits. According to the folder this switch provides an ideal means of control where it is necessary to operate an electric switch in accordance with temperature changes.

With Such Equipment as This—

is it any wonder that—with speed, accuracy and economy—we can produce anything that you may require in

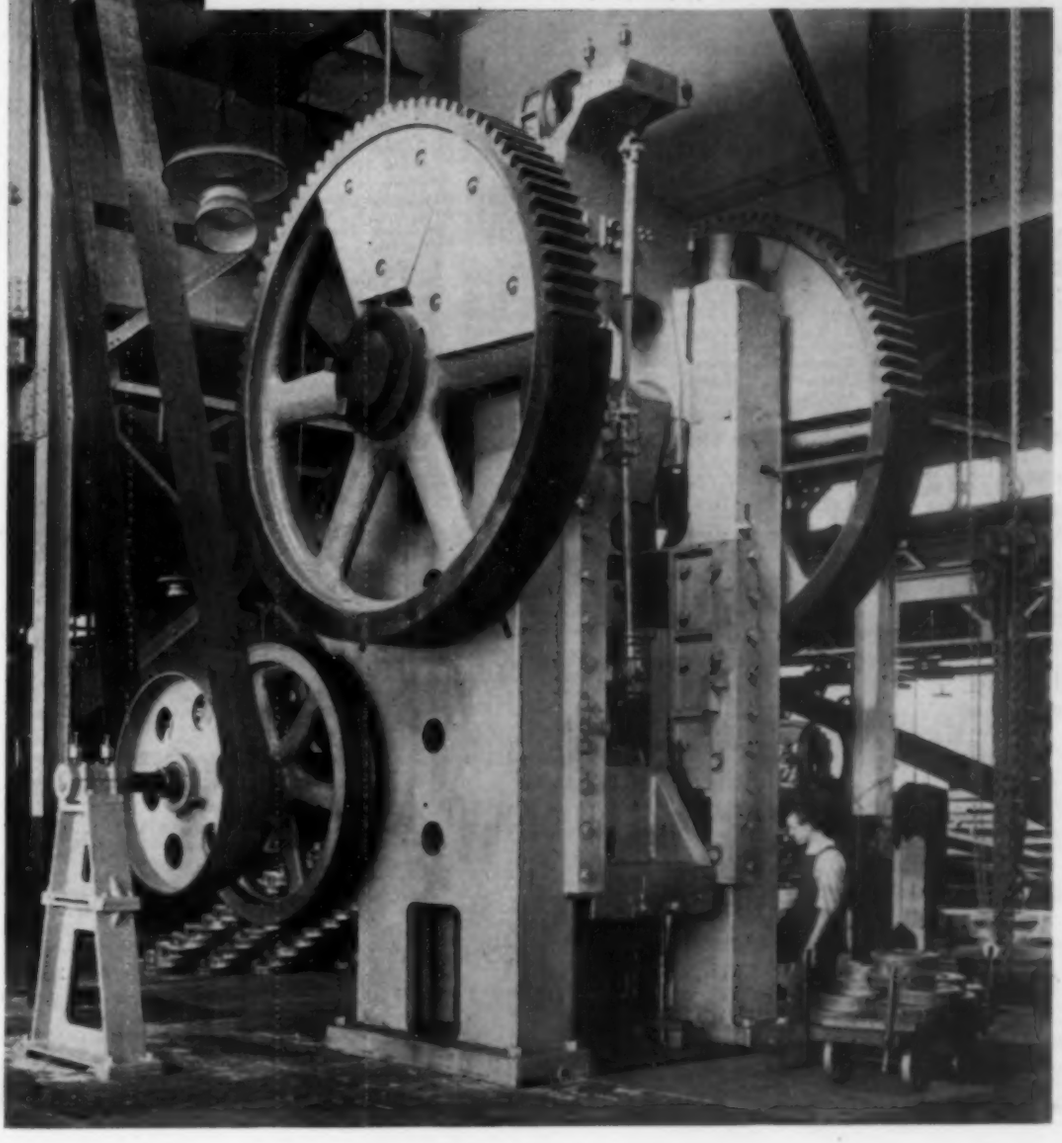
Pressed Steel Parts

Parish and Bingham Pressed Steel Parts are stronger and lighter than castings, and their weight and shape are always uniform. They are tougher than castings. They are not brittle—they will not break under shocks or strains. They are punched for holes without the necessity of drill jigs. When delivered to you, they are *finished* —they require no machine work. And besides these superiorities, we can make them for you much more rapidly and at much lower expense to you than castings would require. May our Engineers help you in deciding where you can use pressed steel parts?

Parish & Bingham Corporation

Builders of Automobile Frames and Steel Stampings

CLEVELAND, OHIO



This powerful press is but one of the 250 with which our plant is equipped. Large or small tho your requirements may be, we have presses that are of the most practical size and style to do the work at lowest cost.

We are also fully equipped with a sufficient number of strictly modern heat treating furnaces to care for our capacity.

P&B

Iron and Steel Scrap Prices

CORRECTED TO TUESDAY NOON GROSS TONS DELIVERED TO CONSUMER

Steel Works Scrap

HEAVY MELTING STEEL

Birmingham	$14.00 to 15.00
Boston (dealers)	13.00 to 14.00
Buffalo	**19.50 to 20.50**
Chicago	17.00 to 17.50
Cincinnati	16.50 to 17.00
Cleveland	18.50 to 19.00
Eastern Pennsylvania	16.50 to 17.50
New York (dealers)	13.00 to 13.50
Pittsburgh	20.00 to 20.50
San Francisco	12.50 to 13.00
St. Louis	15.75 to 16.25
Valleys	20.50 to 21.00
No. 1 railroad steel New York (dealers)	13.75 to 14.25

BUNDLED SHEETS

Buffalo	$14.00 to 15.00
Cleveland (hydraulic)	16.75 to 17.25
Cincinnati	12.00 to 12.50
Eastern Pennsylvania	15.00 to 16.00
Pittsburgh	17.00 to 18.00
St. Louis	9.00 to 9.50
Valleys (hydraulic)	19.00 to 19.50

STEEL RAILS, SHORT

Birmingham	$16.00 to 17.00
Boston (dealers)	13.00 to 14.00
Chicago	19.00 to 19.50
Cincinnati	19.00 to 20.00
Cleveland	16.25 to 17.00
St. Louis	19.00 to 19.50

STOVE PLATE

Birmingham	$16.00 to 17.00
Boston (consumers)	16.00 to 17.00
Buffalo	17.00 to 18.00
Chicago	18.50 to 19.00
Cincinnati (net)	14.00 to 15.00
Cleveland	17.00 to 17.75
Eastern Pennsylvania	16.00 to 16.50
New York (dealers)	13.00 to 14.00
Pittsburgh	17.00 to 17.50
St. Louis	16.50 to 17.00

LOW PHOSPHORUS

Buffalo	$21.00 to 22.00
Cincinnati	18.00 to 18.50
Eastern Pennsylvania	22.00 to 23.00
Pitts. billet and bloom crops	25.00 to 26.00

SHOVELING STEEL

Chicago	$16.50 to 17.00
Pittsburgh	17.50 to 18.00
St. Louis	15.00 to 15.50

KNUCKLES, COUPLERS & SPRINGS

Chicago	$22.00 to 22.50
Eastern Pennsylvania	21.00 to 22.00
Pittsburgh	21.50 to 22.00
St. Louis	21.00 to 21.50

COMPRESSED SHEETS

Buffalo	$18.00 to 19.00
Chicago	14.50 to 15.00
Pittsburgh	18.50 to 19.50

FROGS, SWITCHES, GUARDS

Chicago	$17.00 to 17.50
Eastern Pennsylvania	16.50 to 17.50
St. Louis	16.00 to 16.50

BOILER PLATE, CUT

St. Louis (dealers)	$10.50 to 11.00

ANGLE BARS—STEEL

Chicago	$19.00 to 19.50
St. Louis	17.00 to 17.50

Iron Mill Scrap

RAILROAD WROUGHT

Birmingham	$16.00 to 17.00
Boston (dealers)	14.00 to 14.50
Buffalo	19.00 to 20.00
Chicago, No. 1	17.50 to 18.00
Chicago, No. 2	17.00 to 17.50
Cincinnati, No. 1	14.50 to 15.50
Cleveland, No. 1	12.00 to 12.25
Eastern Pennsylvania, No. 1	21.00 to 21.50
Pittsburgh, No. 1	19.00 to 20.00
Pittsburgh, No. 2	20.00 to 20.50
New York, No. 1 (dealers)	16.00 to 16.50
St. Louis, No. 1	18.00 to 18.50
St. Louis, No. 2	16.00 to 16.50

WROUGHT PIPE

Boston (dealers)	$9.50 to 10.00
Buffalo	14.00 to 14.50
Eastern Pennsylvania	14.50 to 15.00
New York (dealers)	10.75 to 11.25

YARD WROUGHT

Boston	$13.00 to 13.50
Eastern Pennsylvania, No. 1	17.00 to 18.00

CITY WROUGHT

New York, long	$13.00 to 13.50

BUSHELING

Buffalo, No. 1	$17.00 to 18.00
Chicago, No. 1	15.50 to 16.00
Chicago, No. 2	10.00 to 10.50
Cincinnati, No. 1	14.00 to 15.00
Cleveland, No. 1	12.75 to 13.00
Cleveland, No. 2	12.00 to 12.25
Eastern Pennsylvania, No. 1	14.50 to 15.00
Pittsburgh, No. 1	18.00 to 18.50
St. Louis, No. 1	14.00 to 14.50

MACHINE SHOP TURNINGS

Birmingham	$10.00 to 11.00
Boston (dealers)	11.00 to 11.50
Buffalo	14.50 to 15.50
Chicago	10.25 to 10.75
Cleveland	14.25 to 14.50
Cincinnati (net)	11.50 to 12.00
Eastern Pennsylvania	15.00 to 16.00
New York (dealers)	11.75 to 12.25
Pittsburgh	16.00 to 16.50
St. Louis	10.50 to 11.00
Valleys	15.75 to 16.00

CAST IRON BORINGS

Birmingham (chemical)	$15.00 to 16.00
Birmingham, borings (plain)	10.00 to 11.00
Boston (chemical)	17.00 to 17.50
Boston (dealers)	13.50 to 14.00
Buffalo	17.00 to 18.00
Chicago	14.75 to 15.25
Cincinnati (net)	12.00 to 12.50
Cleveland	15.00 to 15.50
Eastern Pennsylvania	16.00 to 16.50
Eastern Pennsylvania (chemical)	22.00 to 24.00
Pittsburgh	17.50 to 18.00
New York (dealers' price)	11.75 to 12.25
St. Louis	11.50 to 12.00
Valleys	17.25 to 17.50

MIXED BORINGS AND TURNINGS

(For blast furnace use)

Boston (dealers)	11.00 to 11.50
Cleveland, small	15.50 to 16.00
Eastern Pennsylvania	15.00 to 15.50
New York (dealers)	11.75

IRON AXLES

Birmingham	$20.00 to 21.00
Boston	27.00 to 28.00
Buffalo	24.00 to 25.00
Chicago	27.50 to 28.00
Cincinnati	23.00 to 24.00
Eastern Pennsylvania	28.00 to 30.00
New York (dealers)	24.00 to 25.00
Pittsburgh	28.00 to 29.00
St. Louis	28.00 to 28.50

IRON RAILS

Buffalo	$19.00 to 20.00
Chicago	22.50 to 23.00
Cincinnati	16.00 to 17.00
Cleveland	18.00 to 18.50
St. Louis	20.50 to 21.00

PIPES AND FLUES

Chicago	$12.50 to 13.00
Cincinnati	11.00 to 12.00
Cleveland	15.00 to 15.50
St. Louis	10.50 to 11.00

RAILROAD GRATE BARS

Buffalo	$16.00 to 17.00
Chicago	18.00 to 18.50
Cleveland	17.00 to 17.75
Eastern Pennsylvania	16.00 to 16.50
New York (dealers)	12.50 to 13.00
St. Louis	16.00 to 16.50

FORGE FLASHINGS

Boston (dealers)	$11.00 to 11.50
Chicago, small	12.00 to 12.50
Cleveland	12.50 to 13.00
Cleveland, large	12.25 to 12.50

FORGE SCRAP

Boston	$9.00 to 9.50
Chicago	17.50 to 18.00
Eastern Pennsylvania, No. 1	15.00 to 16.00

ARCH BARS AND TRANSOMS

Chicago	$23.50 to 24.00
St. Louis	21.00 to 21.50

ANGLE BARS—IRON

Chicago	$23.50 to 24.00
St. Louis	21.00 to 21.50

Iron and Steel Works Scrap

AXLE TURNINGS

Boston (dealers)	$12.00 to 12.50
Buffalo	17.50 to 18.50
Chicago	15.00 to 15.50
Cleveland	17.00 to 17.25
Eastern Pennsylvania	15.00 to 16.00
Pittsburgh	18.00 to 19.00
St. Louis	11.50 to 12.00

STEEL CAR AXLES

Birmingham	$20.00 to 21.00
Boston (dealers)	22.50 to 23.00
Buffalo	21.00 to 22.00
Chicago	20.50 to 21.00
Cleveland	22.00 to 22.50
Eastern Pennsylvania	26.00 to 27.00
New York (dealers)	20.50 to 21.00
Pittsburgh	22.00 to 23.00
St. Louis	21.00 to 21.50

SHAFTING

Boston (dealers)	$18.50 to 19.50
Chicago	22.50 to 23.00
Eastern Pennsylvania	22.00 to 24.00
New York (dealers)	16.00 to 16.50
St. Louis	19.50 to 20.00

Iron Foundry Scrap

CAR WHEELS

Birmingham, iron	$17.50 to 19.00
Birmingham, tram car	18.00 to 20.00
Boston (consumers)	18.50 to 19.50
Buffalo, iron	21.00 to 22.00
Chicago, iron	24.50 to 25.00
Cincinnati	19.00 to 19.50
Eastern Pennsylvania, cupola	21.00 to 22.00
New York, iron (dealers)	21.00 to 22.00
Pittsburgh, iron	22.50 to 23.00
Pittsburgh, steel	21.50 to 22.00
St. Louis, iron	22.50 to 23.00

NO. 1 CAST SCRAP

Birmingham, cupola	$18.00 to 20.00
Boston (consumers)	22.00 to 23.00
Buffalo	21.00 to 22.00
Chicago, cupola	22.50 to 23.00
Cincinnati, No. 1, machinery, cupola (net)	21.00 to 22.00
Cleveland, cupola	21.00 to 21.75
Eastern Pennsylvania, cupola	21.00 to 22.00
New York, cupola (dealers)	17.50 to 18.00
Pittsburgh, cupola	23.50 to 24.00
San Francisco	25.00 to 26.00
St. Louis, agricultural	18.50 to 19.00
St. Louis, railroad	19.50 to 20.00
Valleys	22.00 to 22.50

HEAVY CAST

Boston (consumers)	$19.50 to 20.00
Buffalo	18.00 to 19.00
Cleveland	16.50 to 16.75
Eastern Pennsylvania	19.50 to 20.50
New York (dealers)	15.50 to 16.00
Pittsburgh	19.50 to 20.00

MALLEABLE

Boston (railroad)	$19.50 to 20.00
Buffalo	22.00 to 23.00
Chicago, railroad	23.00 to 23.50
Chicago, agricultural	23.00 to 23.50
Cincinnati, agricultural	17.00 to 18.00
Cincinnati, railroad	17.50 to 18.50
Cleveland, agricultural	18.50 to 19.00
Cleveland, railroad, nominal	20.00
Eastern Pennsylvania, railroad	19.00 to 20.00
Pittsburgh, railroad	21.00 to 21.50
Pittsburgh, agricultural	18.00 to 18.50
St. Louis, agricultural	20.00 to 20.50
St. Louis, railroad	20.00 to 20.50

Miscellaneous Scrap

RAILS FOR ROLLING

5 feet and over

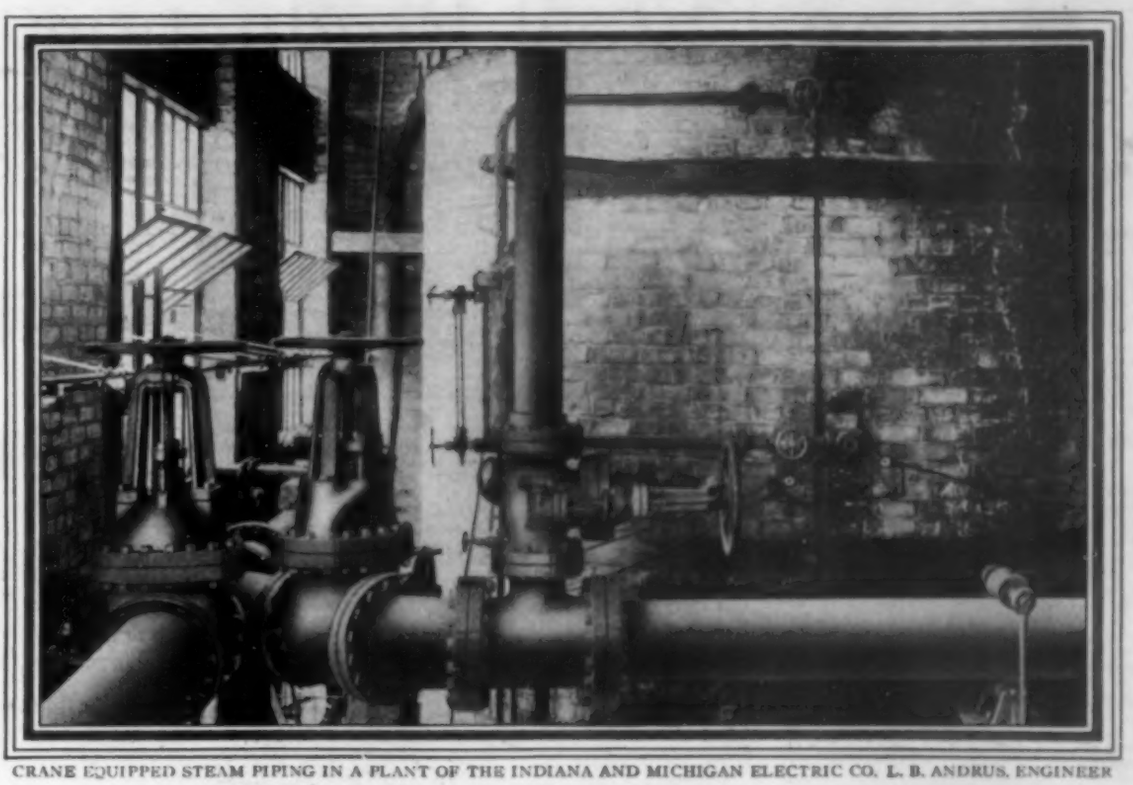
Birmingham	$18.00 to 20.00
Boston (dealers)	15.50 to 16.00
Chicago	18.00 to 18.50
Cleveland	21.00 to 21.50
Eastern Pennsylvania	21.00 to 22.00
New York (dealers)	16.00 to 16.50
Pittsburgh district	21.00 to 22.00
St. Louis	18.50 to 19.50

LOCOMOTIVE TIRES

Chicago	$18.50 to 19.00
St. Louis	19.00 to 19.50

LOW PHOSPHORUS PUNCHINGS

Chicago	$19.00 to 19.50
Eastern Pennsylvania	22.00 to 24.00
Pittsburgh	24.00 to 25.00



CRANE EQUIPPED STEAM PIPING IN A PLANT OF THE INDIANA AND MICHIGAN ELECTRIC CO. L. B. ANDRUS, ENGINEER

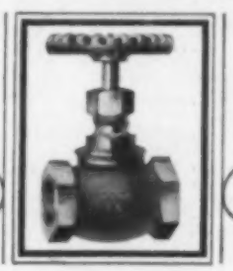
INSURING SAFETY IN PIPING EQUIPMENT

Maximum operating safety and convenience are provided in Crane piping equipment supplied for every power plant need. Crane water gauges, for instance, are designed so that the gauge glasses can be safely and easily replaced when the boiler is under full working pressure. Crane cast steel valves, with renewable monel metal seats and discs, as well as all Crane globe valves, gate valves and check valves are given severe factory tests to prove their fitness under the most exacting service conditions.

CRANE

GENERAL OFFICES: CRANE BUILDING, 836 S. MICHIGAN AVE., CHICAGO

Branches and Sales Offices in One Hundred and Thirty-five Cities
National Exhibit Rooms: Chicago, New York, Atlantic City
Works: Chicago and Bridgeport



Crane 75 Low Pressure Globe Valve

Iron and Steel Production

Compiled By IRON TRADE REVIEW

Pig Iron

	Stacks- No.	In	Output- Total	Av. daily
1907				
January	376	311	2,174,801	69,509
February	374	308	2,047,036	73,109
March	377	304	2,186,709	70,539
April	378	327	2,226,708	74,223
May	391	329	2,291,030	73,904
June	392	341	2,237,420	74,580
July	396	335	2,253,243	72,685
August	397	329	2,243,656	72,376
September	399	329	2,174,148	72,471
October	401	314	2,359,690	76,119
November	398	226	1,820,558	60,685
December	398	154	1,234,733	39,830
Total			25,299,732	
1908				
January	398	139	1,081,813	34,316
February	401	150	1,086,809	37,476
March	398	154	1,229,856	39,672
April	398	146	1,155,122	38,504
May	396	145	1,168,002	37,677
June	395	154	1,106,300	36,876
July	397	166	1,228,604	39,632
August	399	181	1,366,019	44,065
September	399	189	1,416,252	47,208
October	400	200	1,573,824	50,764
November	402	212	1,582,314	52,744
December	403	221	1,723,664	55,602
Total			15,680,140	
1909				
January	406	234	1,787,473	57,683
February	407	233	1,682,470	60,088
March	406	229	1,822,024	58,793
April	406	224	1,731,406	57,687
May	407	236	1,866,757	60,218
June	408	240	1,929,929	64,334
July	409	258	2,088,620	67,375
August	412	278	2,232,642	72,021
September	413	297	2,378,655	79,186
October	413	309	2,589,681	84,001
November	414	311	2,532,740	84,425
December	416	314	2,682,702	86,539
Total			25,337,002	
1910				
January	416	311	2,599,995	83,871
February	417	311	2,429,525	86,747
March	417	310	2,588,736	83,580
April	418	291	2,477,700	82,590
May	421	206	1,871,388	60,367
June	420	271	2,288,279	76,276
July	420	254	2,158,124	69,617
August	422	244	2,103,793	67,864
September	420	234	2,048,461	68,282
October	421	230	2,086,205	67,297
November	421	218	1,910,385	63,679
December	421	193	1,779,899	57,192
Total			26,840,314	
1911				
January	421	210	1,766,658	56,985
February	421	226	1,781,285	63,617
March	421	236	2,165,764	69,867
April	421	220	2,044,904	68,163
May	421	206	1,871,388	60,367
June	421	202	1,773,282	59,109
July	423	196	1,776,108	57,294
August	423	206	1,921,832	61,995
September	423	216	1,973,918	65,797
October	421	214	2,092,061	67,486
November	421	214	1,999,100	66,637
December	422	215	2,032,301	65,558
Total			23,198,601	
1912				
January	421	227	2,052,806	66,220
February	422	235	2,098,796	72,372
March	420	237	2,411,529	77,791
April	421	239	2,377,621	79,254
May	423	243	2,503,341	80,753
June	424	242	2,433,737	81,125
July	422	245	2,402,567	77,502
August	423	255	2,500,163	80,650
September	419	262	2,444,454	81,482
October	422	280	2,683,645	86,569
November	423	289	2,639,562	87,985
December	423	291	2,777,292	89,590
Total			29,325,513	
1913				
January	423	297	2,287,800	89,929
February	423	306	2,778,670	92,095
March	423	278	2,562,823	89,123
April	421	297	2,754,353	91,812
May	421	285	2,716,825	90,865
June	422	283	2,816,883	87,229
July	422	264	2,658,275	82,525
August	424	260	2,537,018	81,839
September	425	258	2,594,098	83,137
October	425	244	2,439,924	81,933
November	424	225	2,529,960	74,322
December	424	191	1,976,138	63,746
Total			30,652,767	
1914				
January	423	199	1,879,336	60,624
February	423	219	1,888,607	67,450
March	423	232	2,341,551	75,534
April	422	212	2,261,501	75,383
May	422	198	2,097,019	67,646
June	422	193	1,904,566	63,486
July	422	187	1,955,324	63,075
August	422	187	1,996,483	64,403
September	422	180	1,882,718	62,757
October	422	162	1,767,227	57,007
November	421	150	1,501,269	50,042
December	421	154	1,495,325	48,236
Total			22,970,926	
1915				
January	421	163	1,591,024	51,323
February	421	179	1,666,592	59,521
March	421	190	2,046,280	66,009
April	421	197	2,114,516	70,484
May	421	207	2,255,157	72,747
June	421	221	2,369,932	78,998
July	421	234	2,563,311	82,687
August	421	246	2,774,825	89,510
September	420	266	2,834,342	94,478
October	420	276	3,120,340	100,656
November	421	285	3,035,235	101,174
December	421	295	3,201,605	103,278
Total			29,573,161	
1916				
January	421	304	3,171,878	102,319
February	421	312	3,078,548	106,157
March	422	315	3,327,630	107,343
April	422	320	3,225,496	107,517
May	423	321	3,364,584	108,535
June	423	325	3,213,818	107,127
July	419	316	3,221,127	103,907
August	419	317	3,197,838	103,156
September	419	326	3,208,041	106,935
October	419	328	3,508,180	113,167
November	420	322	3,317,805	110,593
December	422	309	3,184,178	102,715
Total			39,019,123	
1917				
January	422	310	3,159,839	101,930
February	422	317	2,649,935	94,641
March	423	331	3,255,813	105,026
April	425	333	3,328,061	110,936
May	425	340	3,413,677	110,119
June	427	347	3,260,234	108,675
July	429	351	3,337,442	107,659
August	431	355	3,238,970	104,483
September	431	344	3,140,742	104,691
October	433	354	3,296,286	106,332
November	434	344	3,198,597	106,620
December	435	321	2,885,380	93,077
Total			38,164,976	
1918				
January	435	294	2,403,227	77,523
February	438	319	2,318,242	82,794
March	438	338	3,209,996	103,548
April	437	351	3,273,355	109,112
May	437	360	3,451,884	111,351
June	437	353	3,316,148	110,538
July	437	364	3,408,584	109,954
August	439	371	3,378,479	108,983
September	438	364	3,413,223	113,774
October	437	364	3,482,392	112,335
November	437	360	3,347,844	111,595
December	435	351	3,434,114	110,602
Total			38,437,488	
1919				
January	435	330	3,306,279	106,654
February	435	311	2,943,347	105,270
March	435	279	3,088,023	99,614
April	435	216	2,474,374	82,479
May	433	197	2,107,729	67,991
June	433	199	2,114,028	70,467
July	434	240	2,424,212	78,200
August	432	266	2,742,081	88,453
September	433	163	2,480,790	82,692
October	432	216	1,864,424	60,142
November	432	252	2,407,369	80,244
December	432	262	2,626,074	84,711
Total			30,578,730	
1920				
January	432	285	3,012,373	97,172
February	432	305	2,984,257	102,904
March	433	315	3,375,768	108,895
April	433	278	2,752,670	91,754
May	433	297	2,991,825	96,510
June	433	302	3,046,623	101,553
July	434	291	3,043,918	98,190
August	434	306	3,145,536	101,168
September	434	317	3,124,308	104,173
October	435	290	3,288,341	106,075
November	435	255	2,935,081	97,836
December	435	202	2,700,268	87,105
Total			36,400,968	
1921				
January	436	184	2,414,753	77,895
February	436	155	1,927,088	68,906
March	436	103	1,593,542	51,447
April	436	96	1,190,751	39,691
May	436	90	1,215,272	39,202
June	436	74	1,064,007	35,466
July	435	69	864,642	27,892
August	435	69	954,901	30,802
September	435	84	985,795	32,857
October	435	95	1,234,450	39,821
November	429	120	1,414,958	47,165
December	429	123	1,642,775	52,992
Total			16,506,564	
1922				
January	430	127	1,545,804	53,090
February	429	139	1,630,180	58,220
March	429	155	2,034,784	65,638
April	429	161	2,070,161	69,005
May	427	175	2,309,348	74,495
June	427	191	2,362,455	78,748
July	427	170	2,403,030	77,517
August	427	143	1,810,665	58,408
September	427	189	2,024,008	67,466
October	428	218	2,629,655	84,827

Lake Ore Shipments

Gross Tons, Rail and Water

1921	22,799,077
1920	60,411,572

Ingots and Castings

By American Iron and Steel Institute

	Ingots	Castings	Total
1910	25,154,087	940,832	26,094,919
1911	23,029,479	646,627	23,676,106
1912	30,284,682	966,621	31,251,303
1913	30,280,130	1,020,744	31,300,874
1914	22,819,784	693,246	23,513,030
1915	31,284,212	866,824	32,151,036
1916	41,401,917	1,371,763	42,773,680
1917	43,619,200	1,441,407	45,060,607
1918	43,051,022	1,411,410	44,462,432
1919	33,694,795	976,437	34,671,232
1920	40,881,392	1,251,542	42,132,934
1921	19,184,084	559,713	19,743,797

Monthly Ingot Output

1922	Gross Tons 87.5 per cent of capacity	Indicated total
January	1,593,482	1,820,000
February	1,745,022	1,995,000
March	2,370,751	2,710,000
April	2,444,513	2,800,000
May	2,711,141	3,100,000
June	2,634,477	3,010,000
July	2,487,104	2,840,000
August	2,214,582	2,530,000
September	2,373,779	2,710,000
October	2,872,415	3,280,000